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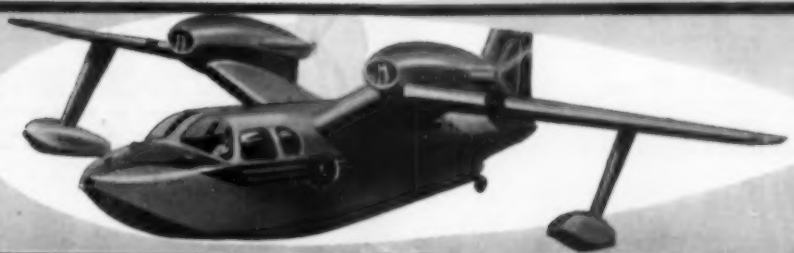

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FLYING

Reg. U. S. Pat. Off.

WILLIAM B. ZIFF (1898-1953) FOUNDER

AUGUST, 1955 VOLUME 57, NUMBER 2

CONTENTS

Fence or Defense, *An Editorial* 18

What's Going On In General Aviation? *A Report* 20

Type 37 22

Hop To Taku . . . . . *Bob and Ira Spring* 24

The Heat's On . . . . . *Frank Harvey* 26

Hangar Flying 28

Air Defense, *An Interview with General Chidlaw* 30

Uranium . . . . . *Clyde Long* 32

Spot Landing . . . . . *John R. Hoyt* 35

Lufthansa . . . . . *Michael Gladych* 36

Flying Scouts . . . . . *Catherine Rucker* 39

Pipeline Patrol . . . . . *Tom McClary* 40

Flying Frogmen . . . . . *William Becher* 42

Ho-Hum, A Record . . . . . *Capt. Charles Banfe, Jr.* 46

Great-Grandma At The Throttle . . . . . *Zaddie Bunker* 47

I Learned About Flying From That! No. 186 . . *Ted Durosko* 48

FLYING FEATURES

Mailbox 6

Briefings 10

Flying Calendar 16

Have You Seen? 44

AOPA News 58

Index to Advertisers 80

Photo Credits 80

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THE COVER: Bob and Ira Spring made this photo of an Alaska Coastal Airlines plane at the Taku Lake dock. See page 24 for story about Taku Lake Lodge.

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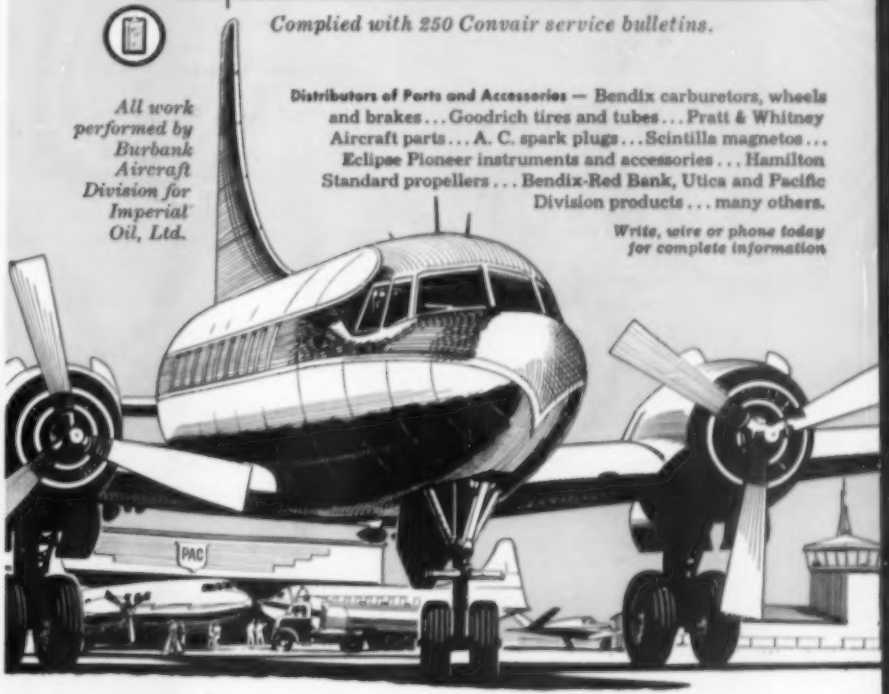

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MAILBOX

FLYING'S EAGLE

I was so pleased to learn that you had granted us permission to use the picture of the Eagle that appeared on the March 1953 cover of your magazine as the Air Force Academy Athletic Association insignia that I immediately started the ball rolling to have letterheads, etc., prepared . . . I want to advise that the Eagle has been adopted as the insignia for the Association.

COL. ROBERT V. WHITLOW
President, Air Force
Academy Athletic Assoc.
Denver, Colo.

IN PERSON

Many thanks to Mr. Ted Durosko for writing such a wonderful story as "Toward A Plane For Everybody", about experimental aircraft. Of all the planes covered in the article, I think that Neal Loving's was the best. I had the pleasure of meeting Mr. Loving in person at Teterboro Airport last year. He told me about his flight from Detroit to Jamaica in the West Indies and all the bad weather he had encountered.

EDWARD W. PRIEBE
North Arlington, N. J.

ANY CUBS FOR SALE?

We like your write-ups in FLYING Magazine so much; they bring us a lot of new ideas. For the past years we have enjoyed sport flying in Germany a lot, although we have been just able to fly our gliders, due to regulations. We expect that these regulations will be changed very soon and many sportfliers are waiting for the day to fly a Piper Cub. We made our new brevets (licenses) in Switzerland lately and are looking for some suitable private planes, preferably used Piper Cubs. We believe that there are many Flying Clubs in the United States who would like to sell some used ships of this type. Any American sportflier has enough experience to give us some good hints on how to operate a modern flying club. We will appreciate any letters from stateside club members to discuss technical and organizational problems.

We hope to make a trip to the United States during the summer to study latest sport-flying developments. We will be very glad to hear from any American flying enthusiasts.

HANS PFAB
Postfach 231
Ludwigsburg, Germany
U. S. Zone

NATIONAL GUARD PILOTS

In the Briefings of the May issue there is an article concerning the shortage of pilots for both fixed wing and helicopter aircraft in the Army units of the National Guard. I have been unable to obtain any information regarding this matter. Several of my friends and myself are very interested. We would like to know whom we should contact.

BERTUS KOEHLER
Fair Lawn, N. J.

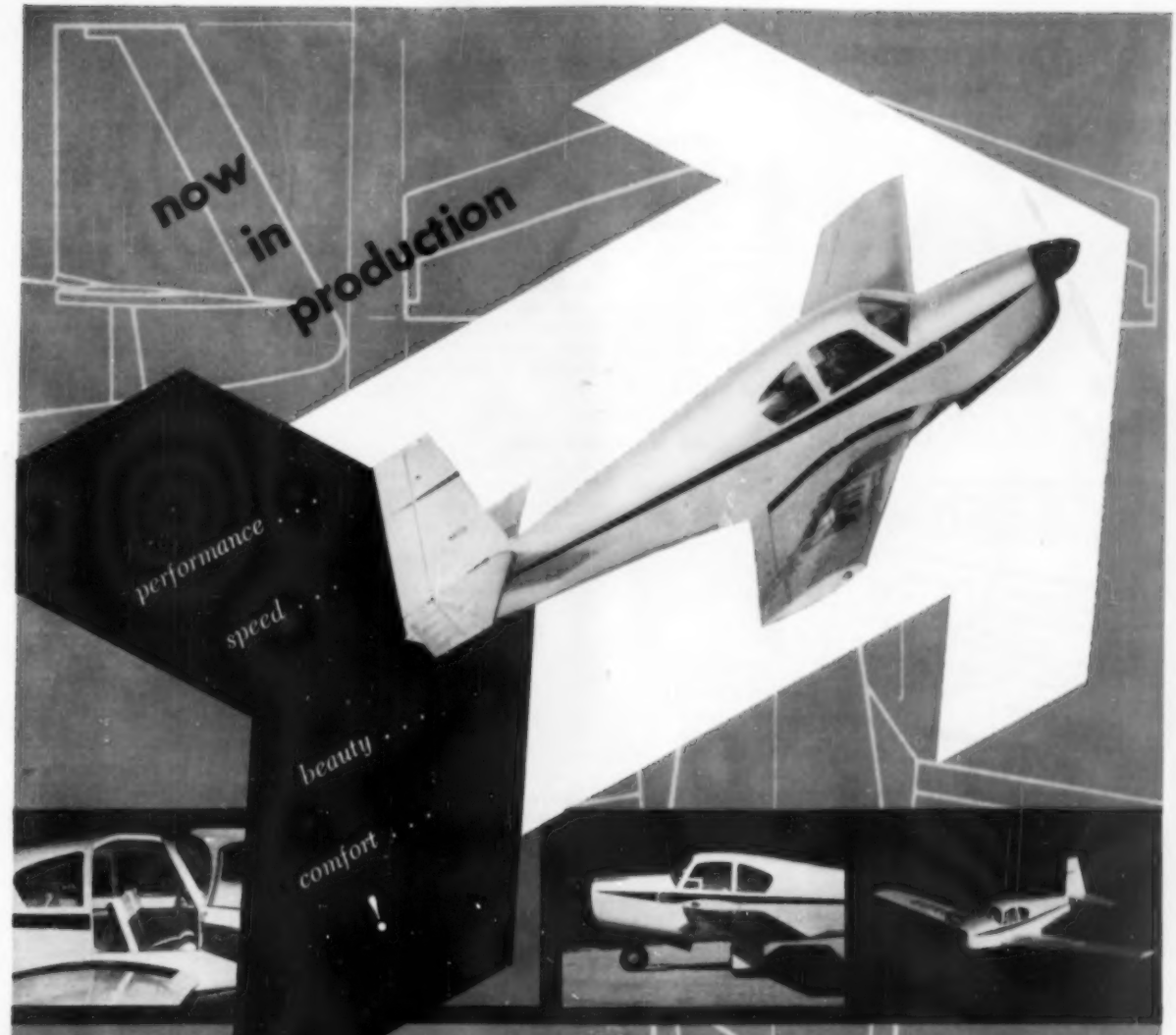
• *The number of letters we have received concerning the Briefings items on Army National Guard pilot shortage would indicate that the Army can have all the National Guard pilots it wants—if it will provide a bit more information on how to apply. In the meantime, we suggest that interested pilots contact Maj. Gen. Edgar C. Erickson, Chief of the National Guard Bureau, Washington 25, D.C.* —ED.

WANTED: AN AMPHIBIAN

My wife and I, like many other private pilots, have been examining the practicality of owning our own plane. Our summer home along the Delaware River provides an ideal, maintenance-free landing strip for floats. However, a strictly water-based plane in this and other areas precludes landing of many of our favorite

spots for visiting friends and for recreation. Obviously an amphibian would be the answer, but there is no low powered (and incidentally low priced) amphibian that combines the economy and flying safety of the light plane with the many advantages of being either land or water-based. This hole in the flying spectrum is evidently due to the inability of manufacturers to construct a truly light plane with a speedboat type hull that will take the strenuous buffeting of a water landing and take off at speeds of 40 or 50 mph.

(Continued on page 8)



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This astonishing new plane flies circles around anything else in its class.

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And it's priced at only $12,500 complete with all standard equipment.

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Be prepared to want one.

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$195 FOB Phoenix, Ariz. complete with A S L Ferrite loop.

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PHOENIX, ARIZONA

MAILBOX

(Continued from page 6)

Now, with the advent and proven ability of the hydro-ski, I am hoping that some manufacturer will jump at the chance to lead the field in a truly light amphibian, since now the hull will no longer necessarily be designed as a boat for high water speeds, but only as a waterproof float—the hydro-skis taking the brunt of high speed water operation.

DONALD M. LAUNER

River Vale, N. J.

KEY TO A PILOT'S HEART

One of the joys of flying is to find a modern well equipped airport that caters to the private pilot. Hulman Airport in Terre Haute, Ind., is a joy to behold and makes a production out of service. Their $340,000 terminal building houses one of the finest restaurants I have ever found on any airport. Harry and Margaret Oldham operate this "Skyway Grill" from 8 a.m. to 8 p.m. and specialize in chicken and steak dinners at very reasonable prices. The field itself boasts asphalt runways over 8,000 feet long and completely lighted at night. There is no landing fee of any kind and complete service and fuel are available at all times. Pilots in this section of the country have made it a habit to fly in and enjoy the hospitality of this operation.

ROBERT D. BEACH

Carmel, Ind.

LET JUSTICE BE DONE

In your issue for January of this year you published a letter from me concerning an article, "Map with a Memory," by Mr. Gladych. In connection with this I wish to point out that my comments on the Decca system of navigation were made purely on the basis of secondhand hearsay evidence and my own uninformed opinion. I had not, at the time of writing, any practical experience in the operation of Decca. Since that time I have had a course of instruction and some limited experience in its operation and, as a result of this, I have completely changed my opinion regarding this system.

I wish to apologize for misleading your readers and I do this without qualification of any kind.

W. MOCKLER

South Ruislip, England

• *In his January letter, Mr. Mockler gave a number of reasons why he felt that Decca would not be suitable for aircraft navigation. We believe he is to be commended for his fairness in rejecting his previous position.—ED.*

THANK YOU!

. . . I take FLYING each month and must say it's a marvelous publication. Once I start reading, I want to read on and on, and wish the book was twice as thick.

JACK H. PICKRELL

Southend-On-Sea, England

. . . I wanted to let you know that I read FLYING magazine thoroughly and enjoy it very much, especially the Mail Box and your feature, "I Learned About Flying From That." It not only is interesting but helpful to learn from someone else's experience. I'd like to add that in my opinion your magazine is enjoyable because it's friendly and thorough.

LARRY STINCHFIELD

Paso Robles, Calif.

. . . This is a letter of appreciation for what I think is the finest magazine for the private pilot that I have ever read. You have yourself a customer for his lifespan (may it total many flying hours). Your series of articles on Instrument Flying are an absolute Godsend. Though I've been unable to put them into practice myself yet, they give me a great deal of confidence. I thought you would be interested to know that you have a lot of friends across the water.

ROY ATKINSON

Davenport, England

OHIO ERCOUPERS

As a result of the article you carried in the September 1953 issue of FLYING on the Michigan Ercoupers, I have had many

letters from fellows wanting advice on how to get such a club started. But the outstanding report was a call from Art Wamberg of Chagrin Falls, Ohio. Art wants to promote an Ohio Ercoupe club. He has a list of every Ercoupe owner in the state, approximately 125, and feels sure that a group can be gotten together for monthly meetings and Ercoupe events.

Upon Art's request, I alerted a small group of Michigan Ercoupers to fly down to the new Toledo Express Airport in May. The Detroit-Pontiac-Flint section of eastern Michigan was represented by seven Ercoupes, shown in the line-up here. Also shown are Art and Mrs. Wamberg.

Interested Ohio Ercoupe owners can write Art at RFD #5, Chagrin Falls, Ohio.

FRANK FULKERSIN

Flint, Mich.

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Please furnish me more information on my opportunity as an Airman in the U. S. Air Force.

Name_____ Age_____

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City_____ Zone____ State_____

Briefings . . .

FORT COLLINS, COLORADO, is becoming a production center for two-place aircraft. Both the Luscombe *Silvaire* and the Ercoupe Model G will be produced there. Rights and assets of the Luscombe plane were purchased from Temco by Otis T. Massey of Fort Collins, who is organizing the Silvaire Aircraft Corp., to manufacture and assemble the *Silvaire*. The Ercoupe manufacturing rights have been purchased by Forney Industries, also of Fort Collins. The company's Aviation Division is now turning out Ercoupe replacement parts and expects to be in production on the complete plane within the next year.

IN THE EIGHT YEARS since its founding, Seaboard & Western Airlines, transatlantic all-freight operator, has made 6,050 ocean crossings. In the last 12 months, over 70,000 monkeys to be used for anti-polio research have been flown by the line to the United States.

OPERATED BY the Rescue Service of the Alpine Police force, the Piper *Tri-Pacer* and *Super Cub* shown below have made hundreds of landings on Austrian and Swiss glaciers at altitudes of 10,000

feet and higher, in the month since their delivery in Europe. The mountain rescue operations are carried out by pilots of the Austrian Alpine Police force, one of whom is shown here, but the planes are of Swiss registry since airplanes as yet cannot be registered in Austria.

AIRLINE PASSENGERS are good credit risks, according to Pan American World Airways, which reports that its passengers have a perfect record in paying their bills. Pan Am's "pay later" plan has been in effect for a year and its credit records reveal no customers in arrears. The line has sold tickets worth more than $4,200,000 under its credit system. Average cost of "pay later" trips is $400. The passenger must make a 10 per cent down payment and pay the rest in monthly installments ranging up to 20 months.

FIFTY-FIVE YOUNG MEN were recruited for the Air Force by WHF-TV's Channel 55 in Harrisburg, Pa. The whirlwind month-long recruiting drive was run by Russ Brinkley, the station's aviation commentator. Only television was employed to attract potential candidates to the recruiting offices. The first 55 men to pass the examinations became members of a special "Flight 55" and, after swearing-in ceremonies, were given an aviation dinner and theatre party by the station.

AIR DEFENSE OF NORTH AMERICA will be entrusted eventually to one supreme commander and directed from one headquarters, according to Air Marshal C. R. Slemon, chief of staff of the Royal Canadian Air Force. Addressing members of the Aviation Writers Association attending a briefing at Canadian Air Defense Command Headquarters, St. Hubert, Quebec, Air Marshal Slemon stated that Canada's total air effort is directed toward defense of the continent, and already operates in very close coordination and harmony with U. S. air defense forces.

NOTICE

Due to a change in production scheduling of FLYING magazine, our "on sale" date is now around the 23rd of the month. Many readers, unaware of this change in printing schedule, felt that they were not receiving their subscription copies on time. Our apologies for not keeping you posted. THE EDITORS

BENDIX HAS ANNOUNCED the first successful airplane flights with all-transistor equipped automatic navigation and landing systems in place of vacuum tubes. The flights included eight automatic landing approaches as well as cross-country cruising on radio ranges, and were made with a new autopilot, the PB-20, aboard Eclipse-Pioneer's B-25 Flying Laboratory.

SOME 200 RECENT OBSTACLES to flight are listed in the latest Airman's Guide, including radio towers, smokestacks and buildings 500 feet or more high. Many already appear on latest aeronautical charts—but *some* do not. CAA warns that new charts cannot be published as fast as new hazards are created and advises pilots to spend a bit of time studying the listing in current Airman's Guide before making a cross-country flight.

AIR TAXI OPERATORS made 10,554 air taxi flights carrying 11,212 passengers at the four New York airports last year.

MEMBER CLUBS of the Northeast Intercollegiate Flying Association held their annual meet this year at Troy, N. Y., in an effort to highlight the importance of the airport to the area. A move is underway to transfer the airport land from the city to the county and eventually to build a radio and television technical institute on the property. The field has three turf runways (longest 2,900 feet) and is situated closer to downtown Albany than Albany's own municipal airport. Clubs represented at the meet were Rensselaer Polytechnic Institute, Yale, Siena, Cornell, Dartmouth, and Union.

DOUGLAS HAS ANNOUNCED that its DC-8 jet transport will be ready for initial flight test in December, 1957, with airline deliveries beginning in 1959. The

swept wing, 150-passenger plane will be capable of flying non-stop L. A. to N. Y. in 4½ hours.

RADIO MOSCOW CLAIMS that a jet freighter, the IL-20, is being used to carry newspaper matrices of *Pravda*, *Izvestia*, *Krasnaya Zverda* and other Moscow newspaper to Sverdlovsk and Novosibirsk so that readers thousands of miles away may get their morning newspapers at the same time as Muscovites.

THREE-COLOR RADAR development has been urged by the Air Transport Association for air traffic control in high density areas. Use of the three primary colors—red, green and blue—would provide any color on the controller's radar display, thereby permitting immediate identification of aircraft in a control area.

IN RECOGNITION of his feat in leading a lost jet fighter pilot to LaGuardia Airport last September, American Airlines Capt. Lloyd D. Reinhard, left, received an Air Force Scroll of Appreciation from

Lieut. Gen. Leonard W. Johnson, Commander of the Continental Air Command. When the jet plane developed electronic trouble, Capt. Reinhard flew his Convairliner alongside and led the fighter down to a safe landing through an overcast.

BRITISH AMERICAN OIL COMPANY of Toronto, Canada, is the first company to take delivery of a *Learstar*, claimed to be the world's fastest and longest-range twin-engine transport. Additional *Learstar* deliveries are scheduled at two per month. Among those who have ordered

(Continued on page 12)

FLY WEATHER-WISE

These weather items prepared in consultation with the United States Weather Bureau

HURRICANES

BE PREPARED for these menacing, revolving windstorms between June and November in the Northern Hemisphere.

The hurricane (called typhoon in the Far East) is a revolving storm originating over tropical seas. Destructive winds of 75 mph velocity or more extend outward from the center for a distance of 50 to 300 miles. Normally hurricanes begin to affect the Gulf of Mexico in June, gradually shifting to the East Coast by September and October as shown on map at left.

Hurricanes move fairly slowly (about 10 mph) before they recurve to the north and northeast, but usually accelerate to 20-25 mph after they are headed north and as they get to the higher latitudes off the East Coast they may move as fast as 50 mph.

If it looks like your plane will be in the path of hurricane winds, it's wise to have it gassed up and ready to move. If you are unable to move it from the storm's path, listen to the Weather Bureau's hurricane advisories and head it into the wind, securing all control surfaces. Tie it down in an approximately level attitude. This can be done by digging holes for the main gear and elevating the tail, if necessary. Note: since the wind blows counter-clockwise around these storms, its direction depends on which storm quarter affects you.

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On long flights it pays to have two or three landing spots in mind. That way, bad weather will never catch you unaware. You'll find there's usually a Flying Red Horse airport within easy flight distance. Here you can get power-packed Mobilgas Aircraft and Mobiloil Aero for protection *plus*. Why accept less for your plane? *Fly Safely . . . fly with the Flying Red Horse!*

SOCONY MOBIL OIL COMPANY, INC., and Affiliates:
MAGNOLIA PETROLEUM COMPANY, GENERAL PETROLEUM CORPORATION

Briefings . . .

(Continued from page 10)

the new planes are Charles B. Wrightsman of Palm Beach, Fla.; Chance Vought Aircraft of Dallas, Tex.; Johnson & Johnson of New Brunswick, N. J.; and Burroughs Corporation of Detroit, Mich.

CERTAINLY ONE OF THE HANDIEST gadgets devised for automatic computation of time and distance, the pocket-watch-sized Navi-watch determines ground speed, distance traveled, ETA with one setting. Records elapsed time in hours and minutes. Price $7.95 from Bar-B Shop, Box 150, Powell, O.

DEVELOPMENT OF BLUEPRINTS for an atomic aircraft engine has been claimed by Radio Moscow. The engine is similar to a conventional jet, with air scooped into an intake, then heated and expanded. But the heat and resulting expansion come from atomic energy instead of conventional kerosene.

A NEW COLOR-SOUND motion picture tells the story of a community that has been aroused by jet noise and how the military and industry have alleviated the problem by explaining what is being done to reduce noise, but why it is necessary if America is to have adequate defense against attack. Although designed primarily for TV use, the 13 minute 16mm film is available free from either the Glenn L. Martin Co., Baltimore, Md., or Modern Talking Picture Service, 45 Rockefeller Plaza, New York, N. Y., for showing to civic and industry groups.

EXECUTIVE, BUSINESS, industrial and private aircraft owners and pilots gathered more than 300 planes strong at Reading Municipal Airport, Reading, Pa., for the sixth annual Maintenance and

Operations Meeting, sponsored by Reading Aviation Service, Inc. Highlight of the meeting was presentation of the Reading Aviation Awards for high standards of excellence for maintenance, going to the 12 pilots whose aircraft were adjudged best in each of the four categories and three weight classes.

A 26-WEEK SERIES of half hour TV shows called "Conquest of the Air", will be produced by CBS and broadcast coast to coast starting this fall. More than 150,000,000 feet of film now in the USAF's depository at Dayton will be made available to CBS network editors, along with technical guidance from Col. Robert Scott, Jr. The TV series will feature the Air Force story.

PARACHUTE JUMPS AT GROUND LEVEL are now possible with a new ejection seat developed by the Martin-Baker company in Great Britain. The device will eject a pilot from a speeding plane before it leaves the runway. It provides safe means of escape on take-off or in low level or strafing missions. The standard 24-foot chute opens automatically.

DENT-PROOF FIBERGLAS wheel pants have been developed for the *Tri-Pacer* by the Warren Aviation Co., Detroit-Warren

Airport, Warren, Mich. The company previously has received CAA approval on fiberglas wheel pants for installation on other Piper models.

THE CIVIL RESERVE AIR FLEET is composed of 290 transport aircraft which have been earmarked by the scheduled airlines from among their total of some 1,400 aircraft for military service in time of national emergency. Another 25 are earmarked as a contingent reserve. CRAF planes and their flight and ground crews are subject to call into military service on 48 hours notice. They would stay in service "for the duration".

REFUELING TANKERS can be made out of the smallest and fastest jet fighter types by use of advanced versions of refueling systems which permit ground crews to quickly convert the planes to tanker role. Several so equipped can fan out to various sectors, rendezvous with a roving patrol plane or interceptor, refuel it, return to base and quickly be converted to their original mission.

ALL FAITH CHAPEL, Solar Aircraft Company's unique spiritual project, was dedicated recently at ceremonies attended by representatives of various religious faiths. The chapel is located on the west side of the Solar San Diego plant area. The project began 2½ years ago when Edmund T. Price, Solar president, said the company would supply the site and materials if enough employees indicated their desire to have the chapel and their willingness to build it themselves on their own time. The proposal was enthusiastically received and ground was broken Dec. 24, 1952. The structure will accommodate more than 100 persons.

(Continued on page 14)

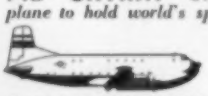
Engineers!

Join this winning team!

At DOUGLAS you'll be associated with top engineers who have designed the key airplanes and missiles on the American scene today. For example:

DC-7 "SEVEN SEAS" *America's finest, fastest airliner*

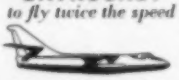
F4D "SKYRAY" *Only carrier plane to hold world's speed record*



C-124 "GLOBEMASTER" *World's largest production transport*

NIKE *Supersonic missile selected to protect our cities*

"SKYROCKET" *First airplane to fly twice the speed of sound*



A3D "SKYWARRIOR" *Largest carrier-based bomber*

A4D "SKYHAWK" *Smallest, lightest atom bomb carrier*

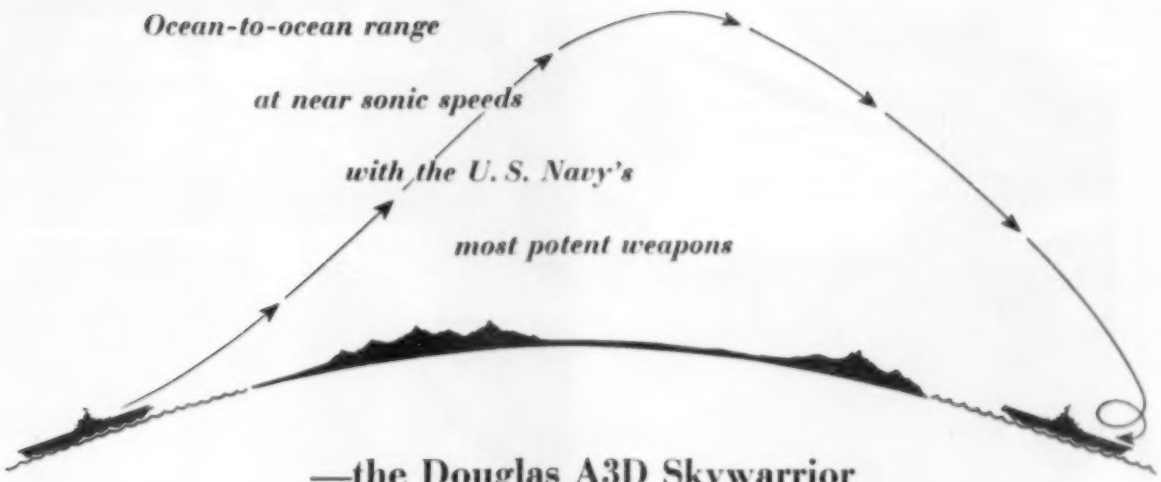
B-66 *Speedy, versatile jet bomber*

With its airplanes bracketing the field from the largest personnel and cargo transports to the smallest combat types, and a broad variety of missiles, Douglas offers the engineer and scientist unequalled job security, and the greatest opportunity for advancement.

For further information relative to employment opportunities at the Santa Monica, El Segundo and Long Beach, California, divisions and the Tulsa, Oklahoma, division, write today to:

DOUGLAS AIRCRAFT COMPANY, Inc.

C. C. LaVene, Employment Mgr.
Engineering General Office
3000 Ocean Park Blvd.
Santa Monica, California



—the Douglas A3D Skywarrior

Largest of all carrier-based aircraft, the Douglas A3D Skywarrior adds new punch, speed and "reach" to the striking force of our fleet air arm.

Skywarrior catapults or sprints from carrier decks to fly in the 600-700 mph class. Its great range with huge payload would permit taking off from a carrier in one ocean, completing a mid-continent bombing mission, and continuing to a waiting carrier in an opposite ocean. Further, its simplicity of airframe allows wide flexibility in the missions it can handle. In short, the twin jet A3D Skywarrior carries on the Douglas tradition of more airplane per dollar.

Designing planes that will fly farther and faster with a bigger payload is a basic Douglas concept . . . a concept which has made Douglas the largest aircraft manufacturer in the world.

Be a Naval Flier—write to
Nav Cad, Washington 25, D. C.

Depend on *DOUGLAS* **First in Aviation**

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THANKS TO YOUR FIXED BASE OPERATOR. He's an expert ready to apply skill and experience to the maintenance of your plane. More than that, he serves as a clearing house for valuable information regarding new products . . . new flying techniques . . . new servicing methods. And because he has immediate access to AIR ASSOCIATES' large, diversified inventories . . . he can assure you top *flight* service by:

- **SUPPLYING YOU WITH QUALITY PRODUCTS AT LOWEST PRICES — because our large purchasing power permits him to buy at lowest prices.**
- **AVOIDING COSTLY DELAYS — we process his orders quickly — rush them in emergencies.**
- **OFFERING WIDE VARIETY — thousands of different types of Air Associates' quality-selected products are available to him.**
- **SELLING ONLY UP-TO-DATE PRODUCTS — we keep him abreast of new product developments . . . help him to avoid over-stocking.**
- **CUTTING HIS PURCHASING COSTS — Air Associates supplies all his needs through one order, one delivery, one payment.**

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Air Associates' service
is your BUY *word!*

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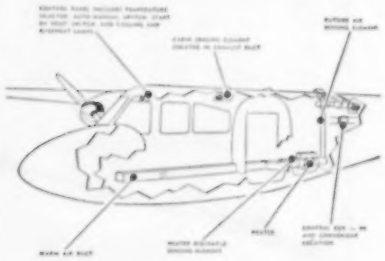
BRANCHES: ATLANTA • CHICAGO • DALLAS • GLENDALE • MIAMI • TETERBORO

Briefings . . .

(Continued from page 12)

AN AUTOMATIC TEMPERATURE control system is now available for Aero *Commanders* from the Barber-Colman Co., Rockford, Ill. The system maintains selected cabin temperature within plus or



minus 2° F. and has been extensively tested in the company's own Model 520 *Commander* throughout a wide range of altitude and ambient temperature conditions. Total weight of the components (shown in the diagram) is about 3½ pounds.

A MUST FOR ANY OPERATOR engaged in maintenance and inspection work, the CAA's new 35-page manual entitled "General Maintenance Inspection Aids" covers, by type and model of aircraft, the general and specific faults which have required correction from time to time. See your CAA Aviation Safety Agent for copies.

THE JEPPESEN AIRWAY MANUAL will be used by Army Aviation as its standard air navigation chart service. Volume 1 will be distributed individually to all Army Aviators in the Continental limits of the United States. Volumes 2 and 3 will be distributed to all instrument rated Army Aviators. The Army ran evaluation flight tests of the manual totaling 376 hours before adopting it as its standard publication.

ARTHUR GODFREY paid a surprise visit to the dinner celebration of the 25th Anniversary of airline stewardesses. Miss Ellen Church, the girl who started it all

back in 1930 with Boeing Air Transport, now United Air Lines, is seated at the right in the picture above.

PLANE FAX

Your Best Week-end Flight Plan for August

Fly to the 34th annual Astoria Regatta for four days of sailboat racing, salmon fishing and other water sports, August 18-21. Plan to land at nearby Clatsop County Airport, Oregon, for quality Standard Aviation Products and service.

Air-lifting phone poles into the mountains

Flying skyhooks! That's what ground crews call James Ricklefs' helicopters that nose up to canyon walls and hover inside rocky gullies, delivering poles along a new telephone route in rugged Southern California mountains. These 'copters also string rope from pole to pole, 5000 feet at a time, so telephone men can pull wires into position without carrying them over the ground.

One of the largest helicopter companies in the nation, Rick Helicopters, Inc., uses Chevron Aviation Gasoline and RPM Aviation Oil to get extra flying hours from all their engines, Franklin 200 h.p. opposed sixes. "Our engines always run at 3100 rpm, putting out full power," says Charles Marthens, Mr. Ricklefs' general manager. "We're getting 600 to 800 hours between majors now, and in our tough service that equals 1200 to 1600 hours of light plane operation. RPM Aviation Oil keeps them running smooth and free, whether we're making take-offs at 10,000 feet in Alaska or fighting forest fires in the States. We'd never use anything else."

TIP OF THE MONTH

From the air, most towns look pretty much alike. In the seven western states, though, you can check your bearings from the rooftop town signs on nearly 500 Standard of California plants.

T.M.'S "RPM," "CHEVRON," "PLANE FAX," REG. U.S. PAT. OFF.

CHEVRON AVIATION GASOLINE

RPM AVIATION OIL

STANDARD OIL COMPANY OF CALIFORNIA

narco gives you your choice of 3 fine OMNIs

1 OMNIGATOR

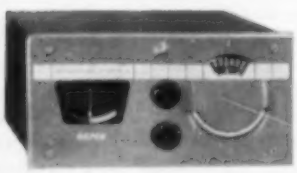
Permits use of virtually every modern VHF navigational aid — VOR (omni), VAR, ILS and 75 mc marker beacon. A fine, precision navigation instrument built to extremely high electronic standards with accuracy exceeding IFR requirements. Factory-certified to be accurate within ±2 degrees. Includes VHF receiver (108 to 127 mcs) and 8-channel 3-watt VHF transmitter. 12 or 24 volts.

2 SUPERHOMER

Most widely used Omni today. This compact, single-unit, two-way VHF communications and navigation unit provides accurate inbound and outbound Omninavigation, includes a VHF receiver and 4-channel VHF transmitter. Combination to-from/left-right meter saves space and cost with no compromise in quality. Weighs only 10 pounds. Fits in any glove compartment. A very reliable, low-cost radio.

3 OMNIPLEXER

Compact 2½ pound pancake-designed Omniplexer attaches to famous Narco Simplexer communications unit to provide an ideal navigation and communications package with wide-band 12-channel transmitter, famous Narco "whistle-stop" feature that permits tuning to precise frequency desired without looking at dial. The ideal answer for low-cost dual Omni. Omniplexer attachment costs only $195.



Whatever your Omni requirements, see your Narco dealer first. You'll find a Narco Omni to fit your pocketbook and your needs. Little wonder more Narco Omnis are in use in farm, business and personal airplanes than all other makes combined!

RELY ON narco

NATIONAL AERONAUTICAL CORPORATION

Ambler, Pennsylvania

FLYING CALENDAR

July 24—Fly-in-breakfast sponsored by the Pottstown Unit, AOPA at Pottstown Airport, Limerick, Pa. Unicom in operation—122.8. Rain date, July 31.

July 24—Fly-in-breakfast and Air Show, Bellingham, Wash. Numerous trophies.

July 24—Greater Cincinnati Airmen's Sixth Annual Trophy Race. Beautiful trophies, buffet lunch and entertainment. For entry blanks write: Greater Cincinnati Airmen's Club, 2d Fl., Adm. Bldg., Lunken Airport, Cincinnati 26, Ohio.

July 30-31—Seattle AOPA Flight, Alpine, Wyo. Flying Saddle Klinger Lodge.

Aug. 5-7—Annual Fly-in of Experimental Aircraft Assn. Curtiss-Wright Airport, Milwaukee, Wis. Contact Paul H. Poberezny, 3801 S. 56th St., Milwaukee 14, Wis.

Aug. 14—Pacific City, Wash., Fish Fry.

Aug. 14—Flying Fish Breakfast, Livingston, Mont. Catch the Big Trout and win $1,000. Spot Landing contest. Write James P. McGuire, Montana Pilots Assn., P. O. Box 662, Livingston.

Aug. 15-20—National Flying Farmer Convention, East Lansing, Mich.

Aug. 19-21—Antique Airplane Association, second annual Fly-In, Ottumwa, Iowa. Contact Robert Taylor at Ottumwa Airport.

Aug. 20—Fourth Quarter of Britain's National Air Show featuring the King's Cup Race. Contact the Royal Aero Club, 119 Picadilly London W 1.

Aug. 27-28—Seattle AOPA Flight to Red's Wallowa Horse Ranch.

Sept. 3, 4, 5, 6—Seattle AOPA flight to Reno, Nev.

Sept. 17—International Grand Prix Races for sports cars at Watkins Glen, offers 3,000 ft. sod runway less than 1,000 ft. from the race course.

Sept. 17-18—Seattle AOPA Flight to Powell River, Kamloops, B. C.

Sept. 18—Walla Walla (Wash.) Chamber of Commerce Air Fair.

Sept. 30-Oct. 2—Flying Farmers Regional Convention at Yakima, Wash.

Oct. 1-7—National Flying Clubs of America's First Annual Meeting, Seattle, Wash.

Oct. 8-15—All Texas Air Tour—the seventh annual tour. Contact Texas Aeronautics Commission, Austin.

Oct. 18—7th Annual Aerial Spraying and Dusting Conference Wenatchee, Wash.

Calendar items must be received at FLYING's editorial offices, 366 Madison Ave., New York 17, N. Y., three months prior to the event.

You could be here.

FLYING YOUR OWN PLANE for BUSINESS or PLEASURE

It takes no superman with years of training or perfect physical condition to fly a modern business airplane like the Piper Tri-Pacer. The typical businessman-pilot today is a man between 40 and 50, who probably wears glasses and who learned to fly within the past five years. He's also a keen, progressive individual, who gets more work done and still finds time for more fun—thanks to flying.

People just like yourself are "discovering" flying every day. Over 20,000 planes are now used by business firms alone; thousands more are flown by farmers, ranchers, and professional men with little time and lots to do.

If you can drive, you can no doubt learn to fly safely. And you'll find that the ability to fly is tremendously useful in your business, immensely fascinating as a hobby, and unusually satisfying as an accomplishment. FLY today! See your Piper dealer.

Sooner than you think YOU CAN LEARN TO FLY WITH EASE...

Many new aeronautical advances make flying so simple and safe that records show business flying is now many times safer than automobile driving. Helping to set this record is the four-passenger Piper Tri-Pacer which combines more features to simplify flying than any plane available today, such as:

TRICYCLE LANDING GEAR takes the skill out of take-offs and landings, improves handling in high winds. An exclusive Tri-Pacer feature in its class.

NAVIGATION EASE. A very significant improvement is the vast new simplified VHF Omninavigation system which takes the uncertainty out of cross-country travel and gives crystal-clear communications, as convenient as your telephone, for securing up-to-the-minute weather information and en route forecasts.

SIMPLIFIED CONTROLS coordinate rudder and ailerons automatically, let you fly with wheel alone or feet alone. Another Tri-Pacer feature exclusive in its class.

INHERENT, BUILT-IN SAFETY. The "character" of an airplane is determined largely by the shape of its airfoil. The airfoil section of the Tri-Pacer gives it ideal all-around characteristics...good weight-lifting, good high speed and excellent slow-flight characteristics and, above all, the ability to forgive student errors.

USEFUL PERFORMANCE. Speed, range and comfort with economy are yours in the 1955 Tri-Pacer. Cruising speed of 132 mph lets you get so much more done in less time.

LEARN TO FLY AS YOU TRAVEL. Newest, simplest most practical way to learn. On your next business trip simply charter a fast, comfortable Tri-Pacer from your Piper dealer and he'll teach you to fly en route giving you practical cross-country navigation training all at the same time. Send for special "Learn as you Travel" brochure or see your Piper dealer.

PIPER
AIRCRAFT CORP.
Lock Haven • Pennsylvania

Please send me literature as checked: G-3

- ☐ Please send new brochure on 1955 Tri-Pacer
- ☐ Please send "Learn as You Travel" Brochure
- ☐ If under 18, check for SPECIAL brochure with photos, drawings of all Piper planes.

Name_____

Address_____

Town_____ State_____

MORE PEOPLE HAVE BOUGHT PIPERS THAN ANY OTHER PLANE

FLYING
VOLUME 57, NO. 2
AUGUST, 1955

AN EDITORIAL

Fence or Defense

EVEN THE GREATEST FORCE, bereft of the zeal of youth, can not return dividends on its greatness.

We believe that, unless the American boy is launched on the air ocean in his formative years, both he and his country will one day be swept into oblivion by its irresistible currents.

We believe it is stark injustice to throw the coming generations into the fierce global rivalries of the air age with no greater indoctrination than is now the lot of American youth.

We believe the aviation heritage of the American people is the surest guarantee of their continuing ability to exercise moral force for the freedom of mankind and the peace of the world.

Let us then consider the following fact. We requested of the Civil Aeronautics Administration the average age of the pilots currently active in general aviation—pilots other than those in scheduled airline flying and military operation. They gave us the average age of 30 years for our 162,959 private pilots and 33 years for our 72,685 commercial pilots.

Thus our average pilot is not a youth but a matured family man, 14 years out of high school. How hapless would be our national future if every citizen was more than 30 years old! And can the future of aviation be less hapless if this condition continues to exist!

It is high time that all of aviation—civil and military—close up ranks to ward off threatened decadence of America's air future. And is this matter of less importance to the Congress, to the President, or to the people themselves? We think not.

Certainly we rejoice that our general aviation pilot is a man of substance—has purchasing power for business and pleasure. But what of tomorrow's market?

America's prime and primary aviation requirement is as simple as boosting a kid over a fence. If our leaders are leaders, let's see them tackle that one.

Gill Robb Wilson

Gill Robb Wilson
Editor and Publisher

NEW YORK

Between these cities, American Airlines offers the most frequent nonstop service with the world's fastest airliners—the DC·7's!

Lv. New York	(EDT)	10:00 am	12:00 noon	4:00 pm
Ar. Los Angeles	(PDT)	3:35 pm	5:35 pm	9:35 pm
Lv. Los Angeles	(PDT)	9:00 am	9:00 pm	11:00 pm
Ar. New York	(EDT)	7:40 pm	7:40 am	9:40 am

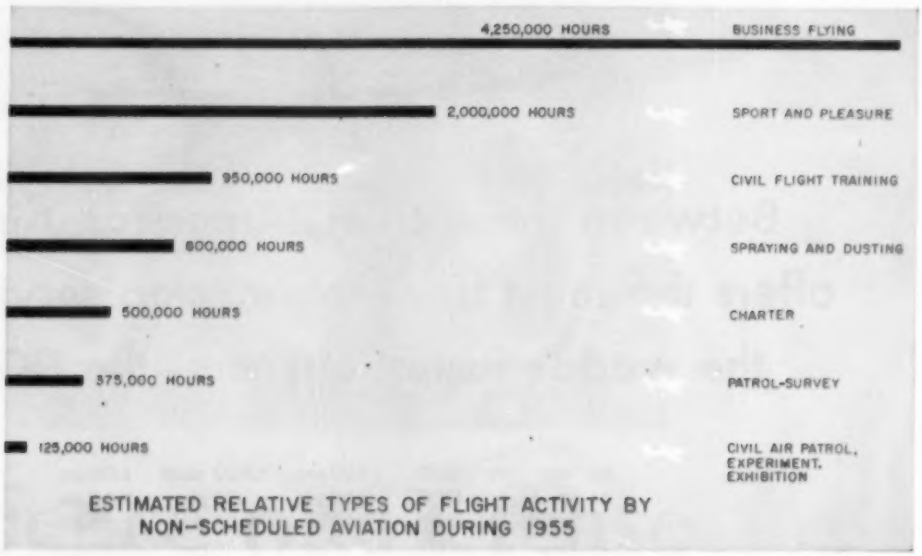
AA
AMERICAN AIRLINES
America's Leading Airline

LOS ANGELES

What's going on in

A FLYING Magazine Report with estimates of 1955 activities and trends.

FIG. 1



ESTIMATED RELATIVE TYPES OF FLIGHT ACTIVITY BY NON-SCHEDULED AVIATION DURING 1955

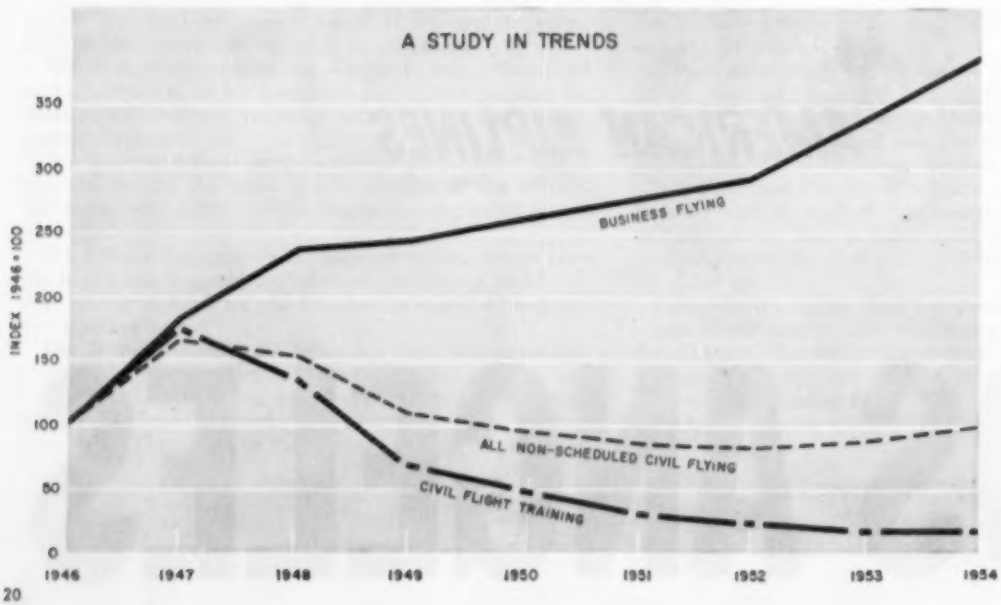


FIG. 2

general aviation?

COUNTLESS TIMES WE ARE asked: "What's going on now in the field of non-scheduled civil flying?"

Understandably, exact official reports must always await a copious volume of information, often tardily sent in from the far-flung fields of aviation. Nor can officialdom stick its neck out editorially.

We have no such handicap. Our only limitation is one of honest reporting according to the best information we can gather from every source, and of drawing sound conclusions from what we judge to be reliable information.

The following picture we hope is sufficiently basic to convey a relatively clear idea of "what's going on now in the field of non-scheduled flying." It is not designed as a work of mathematical art, but we believe it is accurate within tolerable fractions.

With this understanding then, let us have at it.

Sixty-one thousand aircraft of general classification will fly 9,000,000 hours over American skies during 1955. By "general classification" is meant all aircraft other than those in military or scheduled airline service.

This flying will be done chiefly by 162,959 private pilots whose average age is 30 years, and by 72,685 commercial pilots whose age averages 33 years. By contrast, airline pilots number 11,840 with an average age of 36. True, there is a total of 596,126 licensed pilots of all classes, but only the above enumerated have current medical certificates and participate actively.

The bulk of all general aircraft is based on some 2,700 "public" airports, exclusive of military fields. Of this total about 1,300 are paved and 1,100 lighted adequately for all purposes. Additional to these airports are approximately 4,000 other "limited" landing facilities such as small private fields, farm, ranch and industrial strips, seasonal use fields, seaplane bases, heliports and abandoned military facilities. The number of "limited" fields has led to an oft quoted estimate of some 6,000 "airports" in the American pattern. Truly the limited fields add vastly to the utility of general aviation but many are scarcely "airports" in the sense of being stabilized public facilities.

Estimated breakdown of the general aircraft fleet of 1955 is as follows:

1-2 place single engine aircraft	33,500
3-or-more place single engine aircraft	24,250
Multi-engine aircraft	3,250

Estimated usage of the total fleet in 1955 (Fig. 1) gives a hint as to the reason for the rise in numbers of the "3-or-more place" planes, and of multi-engine craft. Of the total of 9,000,000 hours to be flown in 1955 by civil aircraft other than scheduled airlines, the following proportional use will prevail:

Business flying	4,250,000 hours
Pleasure flying	2,000,000 hours
Commercial flying (all types)	1,800,000 hours
Instructional flying	950,000 hours

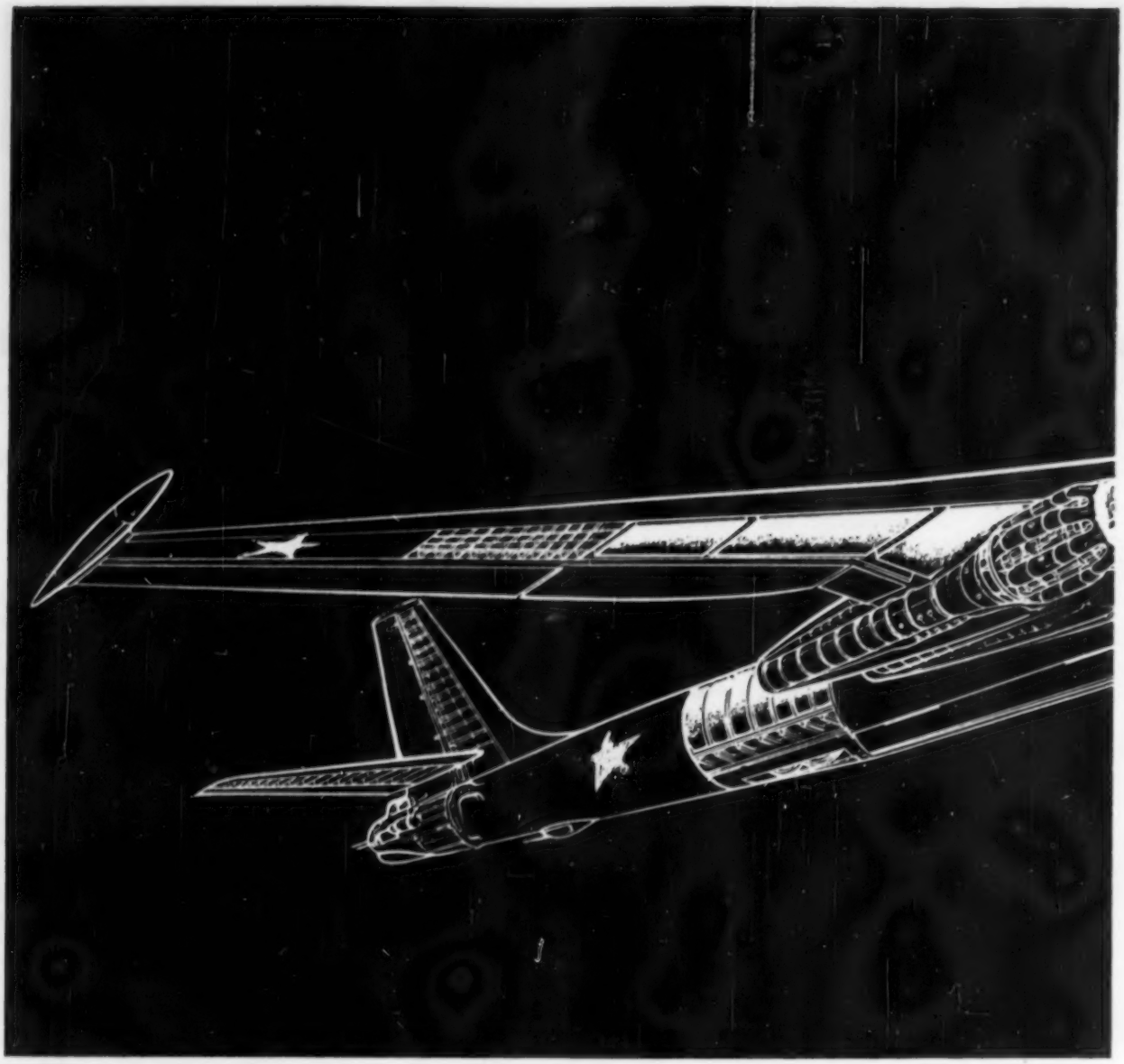
Certain basic conclusions become very clear. Business flying continues its gradual but steady climb as the major utility of the general aircraft fleet.

General Aircraft Reporting Some Business Flying

Year	% of total	Year	% of total
1946	29	1951	52
1947	31	1952	51
1948	36	1953	57
1949	37	1954	60 (est.)
1950	No survey	1955	64 (est.)

Pleasure flying also shows an upward creeping, due not to the fact that more new aircraft are being purchased primarily for pleasure, but that the diminishing purely pleasure fleet is being augmented by good business planes which lend themselves admirably to pleasure flying in off hours. Men who become accustomed to flying on business are most apt to take the family for week-end visits via air; to spend their vacations on air tours; to go further afield for hunting and fishing by private plane. Most automobiles used primarily for business are at times used for personal convenience or pleasure; and so it is with the business aircraft.

Commercial flying—crop dusting and spraying, patrol of pipelines and powerlines, aerial surveying and mapping, charter work for passengers and cargo (including non-certificated irregular air carriers but not including their military contract flying) and various jobs of expediency done for hire—creeps slowly up, year by year. The one phase of commercial work which has shown recent decline is charter flying. This activity skidded 18 per cent in 1953 and, while percentage of decrease has tapered off, the skidding is not fully arrested. We estimate the skid was due to purchase of planes by former customers of charter work and to the increased drive of scheduled airlines for cargo business. We believe charter and rent-a-plane will rebound gradually because it has an acknowledged permanent utility comparable to the U-Drive-It and taxi development in the automotive field. Along with business flying, commercial activity represents a utility essential to the national economy and has no fixed ceiling. Its greatest (*Continued on page 59*)

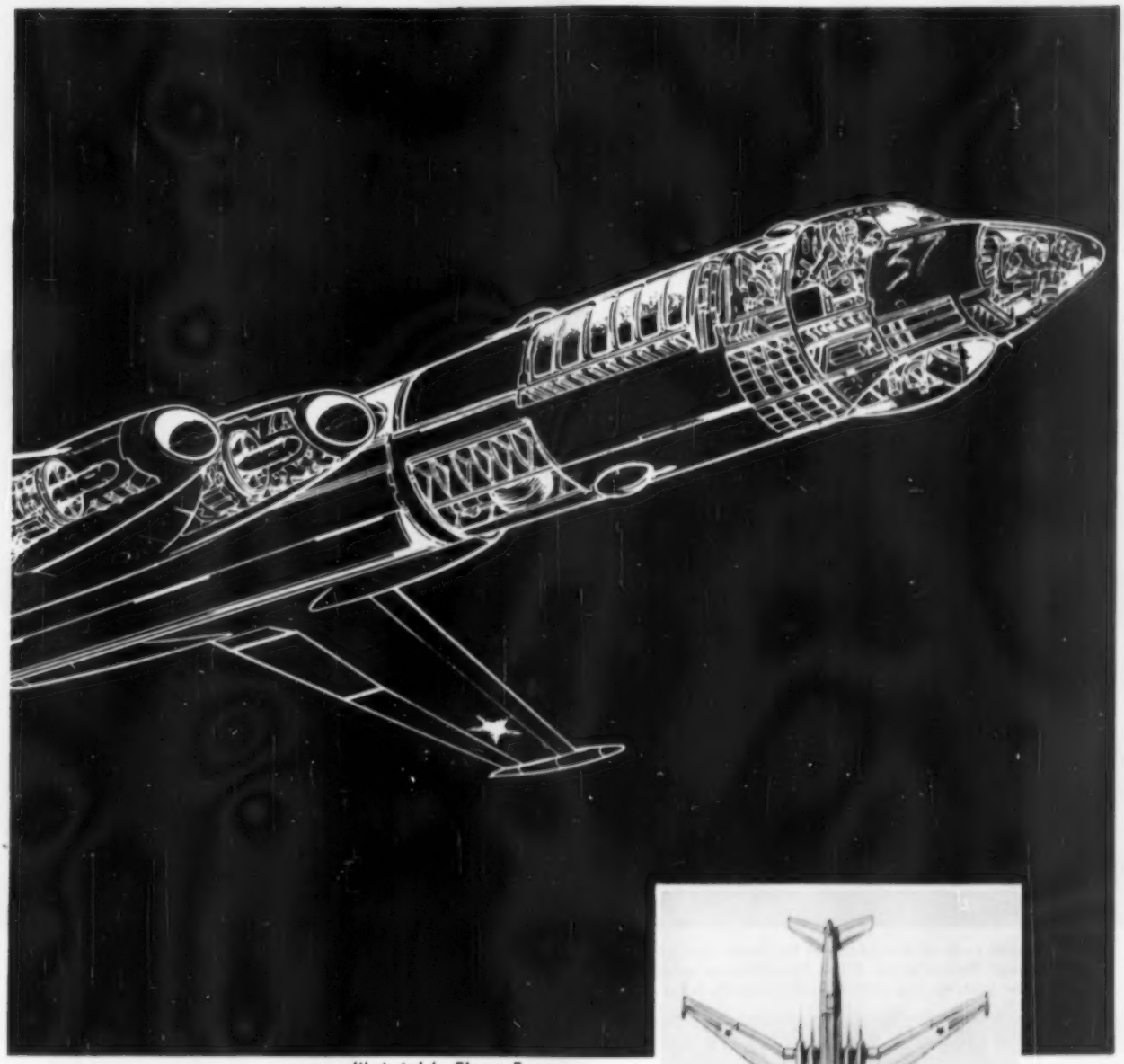


TYPE 37

The free world is tardily, if properly alarmed by news of Russia's Strategic Air Command, Aviatzia Dalnego Deistvia (ADD). Why tardily, is a good question.

Design ability of such men as Tupolev, Mikoyan, Gurevich, Lavochkin, Yakovlev, Ilyushin and their confréres is an old story. Add to their talents, skills gained from satellites, kidnapped from Germany or filched from the West, and the total of Soviet capability is enormous. Equally impressive is Soviet talent in the aircraft engine field. Experts such as Chelomei, Klimov, Mikulin, Kostikov and Charomskii would grace any roster. Also, in 1945, the Red Army garnered such famed German engine plants as Walther, Argus, BMW and Junkers; and in '48, Britain gave the Reds both the Derwent and Nene jets.

Direct this total of resources toward a military objective without regard to civil economy and results should be impressive. Strategic aircraft, such as Type-37 with by-



Illustrated by Thomas Turner

pass jets of 20,000 pounds thrust each, are not surprising in prototype or production. Place this aircraft on a string of 200 airports along the 160° of Soviet longitude—like an umbrella over the United States. In a hop of 3,500 miles from eastern Siberia, it could hit every vital U.S. target; in a similar flight from Murmansk, it could clobber our entire industrial east. If the Mig-15 was not sufficient evidence of Soviet intent and capability, Type-37, and its lighter counterpart, Type 39, should be.

Only two vital advantages remain to American Air supremacy—a proven skill to wage strategic air war, and a superior supply of hydrogen warheads. The skill element is probably of greater importance.

The above cutaway of Type 37 is drawn from best available data and photographs. The prototype appeared in July, '53; a flight of ten crossed Moscow in May, '55; and the aircraft comparable to our B-52, will probably go into operational use long before the B-52 is ready. G.R.W.

Large drawing shows cutaway of Russian Type 37 *Bison*. Inset shows its approximate size as compared with our B-47 *Stratojet* medium bomber.

Above: Rugged peaks on eastern side of the Juneau Ice Cap as seen from plane bound for Taku Lodge. Below: Fantastic icebergs float around in Twin Glacier Lake, which is easily accessible from the lodge by boat.

HOP TO TAKU

Just a 20-minute flight from Juneau to glacier-bordered luxury in the wilderness.

By BOB and IRA SPRING

Right: A visiting pilot gets a lift from plane to lakeshore. East Twin Glacier visible at rear.

Right: Royal O'Reilly, host at Taku Lodge, entertains guests before a roaring fire in lobby.

IT IS ALWAYS a surprise to find luxury in the wilds. Taku Valley, 30 miles inland from Juneau, Alaska, with access only by plane or boat is one of the most surprising spots on our continent.

Here is an abundance of fish, big game and natural attraction which must be seen to be believed. A big log and stone lodge, surrounded by numerous rustic cabins is equipped to provide the utmost in modern comfort.

Exploring the Taku River and its sidestreams is unforgettable entertainment. Narrow, flat-bottomed boats take visitors up shallow streams which lead into lovely glacial lakes. Icebergs in Disney-like shapes float by as boats approach the 100-foot velvety blue ice walls which are the mouths of glaciers. Birth of these icebergs is a thrilling sight. Huge cliffs break off the glacier walls with a roar like thunder. Small chunks of this sparkling clear ice are collected on the way home to dress up cocktails at the lodge's glacier-view bar.

Wilderness and luxury are not the only contrasts. A hundred feet from the glacier-fed lake is a small warm springs lake—mecca for swimmers. Fish-chasing scows poke up the many streams, tree-tunnelled in jungle-like fashion. Moose and bear are hunted from these craft. The odd-shaped boats occasionally jump beaver dams.

Taku glacier is one of the few still advancing glaciers on earth and is now shearing off a stand of huge Douglas fir. If you take the 20-minute air shortcut from Juneau to Taku, your plane flies over the Juneau Ice Cap, where the ice rivers originate. Commercial air service to the lake is available on Alaska Coastal Airlines.

There is an interesting history to Taku lodge. Built by an eastern doctor many years ago for his incurably ill son, it was deeded over to the nurse who cared for the boy. The Alaskan nurse, famous for a spectacular 1,000-mile dog team trek from Taku to Fairbanks in 1935, still lives at the lake and adds much to the local color in spinning tales of the "early days" in best sourdough tradition.

The lodge is the nearest thing to downright luxury in the rugged North with hot and cold running water, showers, electric lights and mechanical insect exterminators. Mr. and Mrs. Royal O'Reilly, host and hostess, carry on a planned recreational program of fishing, swimming, hiking, etc., which exploits to the full the vast potential of the valley for a memorable vacation. END

A new problem of high-Mach flight presents itself in the Heat Barrier which, unlike the Sound Barrier, can not be broken.

THE HEAT'S ON

By FRANK HARVEY

OUR COMING LINE OF big brute fighters with 20,000 pounds of thrust are said to move briskly up to Mach 1.5 (1,000 miles an hour) and hold it "for an extended period." Since 1,000 miles an hour will eventually heat an airplane to an "equilibrium temperature" of around 400 deg. F., the planes could fry their pilot's ears off, if held wide open long enough.

Other unpleasant things could happen: the outer skin could lose some of its strength and begin to "creep"; dangerous thermal strains could be set up in the airplane structure; and perhaps one of the jet engines could throw a bucket.

All of which adds up to one fact: the "Heat Barrier" is here. We've got to start doping out the answers or lose the prosperity and security which lie in American air developments.

Until recently the general public knew little about the Heat Barrier except what it read in the funny papers. However, the American Society of Mechanical Engineers (ASME) has completed the first full-dress investigation of the high-speed-hot-speed problem and some brand new and exciting information is available.

Let's start by defining the Heat Barrier. It's not like the Sound Barrier. You don't "break through it," ever. The faster you fly, the hotter you get. The Heat Barrier is caused by increasingly savage friction between air and airplane. If you keep whipping up the horses, you'll melt like a Dali watch, or disappear in a puff of metallic dust. Aluminum, by the way, melts at Mach 5—3,800 miles an hour. Steel melts at Mach 6—4,500 miles an hour.

This problem is so new that even the engineers are having a family squabble about it. There are, at the moment, two schools of thought. School No. 1 advocates *avoiding* the Heat Barrier as much as possible. Take the airplane very high, they say, where the air is thin and friction is slight, before you lay the buggy whip on the nags. Also—be careful to limit your flight time. If you fly high enough, say advocates of School No. 1, and if you keep your flight time short, you can have your cake and eat it too. Not only do you manage to reach your destination—but you reach it in the same configuration with which you left your take-off point.

School No. 2, however, takes a dim view of this idea. Those who wish to duck the "Heat Barrier" may do so if they wish—but they are not really solving anything by so doing. You either lick the heat or you don't, says School No. 2. The thing to do is build a plane that can heat up—maybe even cherry red—and still keep flying without coming apart or barbecuing the pilot.

"What good is a supersonic fighter," ask the champions of red-hot flight, "if the pilot has to keep looking at his watch to make sure he hasn't parboiled his ailerons?" They answer this question for you, "No good at all!"

Since this is a complex business, I'd like to blueprint it in easy stages. Amazing fact, number one, is the queer behavior of the thermometer from sea-level up to the point of "no air at all." As every lightplane pilot knows, the air gets progressively chillier as he climbs skyward. What we may not know is that this situation reverses itself around 100,000 feet. Above that level the air starts getting hotter and hotter until, at 170,000 feet, it is a blistering 170° F.

This means little to the pilot of the Mooney *Mite*, but plenty to the pilot of a 3,000-mph airplane. Instead of a cool 67 below which he enjoys between 40,000 and 100,000 feet, he has to contend with air that is hotter and hotter. Actually, if you consider the minus 67 and the plus 170, the poor guy experiences a variation of 237 deg. F. by going to 170,000.

One of the sobering facts brought out in the ASME confab is that you can't avoid the Heat Barrier, merely by going high—if you intend to stay up there long enough for the airplane to rise to "equilibrium temperature."

A significant graph has been prepared by H. W. Adams, Chief Design Engineer, Douglas Aircraft Company. It plots rise in temperature against altitude for Mach 2, 4 and 6. The curves are identical for all Mach numbers as far as *shape* is concerned. The temperature rise does not vary with altitude but only with Mach number. We can't get away from high temperature by flying higher.

If this sounds like gobbledegook to you, let's put it in words of one syllable. At Mach 2—1,500 miles an hour—Adam's curve shows that a plane would heat up to 500 degrees F., if allowed to fly long enough at sea level. At 35,000 feet, the plane would heat only to about 350 deg. F. and hold this temperature at all altitudes up to 100,000 feet. Then it would get pro- (*Continued on page* 63)

"The thing to do is build a plane that can heat up—maybe even cherry red—and still keep flying . . ."

HANGAR FLYING

EDITOR'S NOTE: *Exchange of flying experience has been historically of high value to the development of American airmanship. Since such exchange is less feasible at modern airports,* FLYING *hopes to project that value through the medium of a monthly section entitled "Hangar Flying." All airmen are invited to contribute to this section as a service to pilots.*

SEVERAL YEARS AGO two friends and I flew to Alaska. On the return trip, we started hitting low ceilings and sat down on the highway near a Lodge northwest of Ft. St. John.

The problem of closing out my flight plan presented itself, as the Lodge had no phone. We were near the high point on the highway (nearly 4,000 feet), so I decided to try my low frequency transmitter and, to my amazement, Ft. St. John answered. I closed my flight plan and told them I would continue in the morning, weather permitting.

The next morning we found a light frost over the entire airplane. On the windshield it was half frost and half water, which easily wiped off with a cloth. I took considerable time to warm up the motor. The prop blast cleared the fuselage of frost and also the wings about halfway from the fuselage. The frost was so light I did not think it would make any difference, although I had read many stories about frost and ice destroying lift.

The owner of the Lodge went ahead in his pickup to stop possible traffic, and we taxied about three-quarters of a mile to get to a straight stretch in the highway. The road, an ordinary graveled surface, had a ditch on each side and, beyond the ditch, was a solid mat of small trees.

I started to take off. Ordinarily the *Bonanza* will lift easily at 60 mph indicated with half flap, but this time I let the speed build up to 65 before pulling it off.

To my amazement, the right wing stalled out immediately after take-off, throwing the plane over to the side with the right wheel over the shoulder of the road. To cut the power would be fatal, as I would not be able to keep the plane from crashing into the trees. I kept full power and used left aileron and left brake. After building up air speed to past 70 mph, I had to pull it off again as we were fast approaching a turn in the road. This time the *Bonanza* came off and stayed in the air.

The whole thing happened in a matter of seconds, but I'll remember frost nearly did me in as long as I live.

W. H. HINSELMAN

Winner, S. D.

THIRTY-FIFTH FIGHTER GROUP operations in June, 1945, consisted primarily of close support for Army ground forces on Luzon. The Japs had been routed from the skies. Fighter sweeps to Formosa were conducted, but dive-bombing and strafing in ground support comprised the majority of our activity.

Missions were run each morning and afternoon. On this particular day, I was scheduled to fly the morning mission.

Tossing our chutes into the bed of the truck, nine of us climbed aboard and drove from the 40th Fighter Squadron camp onto the blacktop highway leading from Fort Stotsenberg to Clark Field. As we approached the end of the ramp, we spotted a B-24 with a crumpled left landing gear. We could see that the big bomber had missed the crossing over a culvert between the old strip and the ramp. The left wheel had dropped into the ditch, and the plane was badly damaged.

We were vociferous in our denunciation of the pilot, ignoring the possibility that some mishap might have occurred which sent the plane too far to the left. Our operations officer had harped on taxi accidents persistently until he himself drove his F-51 into the side of a gasoline truck. But we were cautious pilots who knew where we were going and could not understand such pilot error. Chattering indignantly about the accident, we turned right behind the bomber and drove down the taxi-strip toward our revetment area.

This old strip intersected the overrun of the new active runway at about a 45° angle. None of us gave any thought to traffic on the new strip and no one bothered to turn his head to glance down its length.

As we entered the intersection of the two strips, I was horrified to see a B-24 just breaking ground not 100 yards away. We had blundered directly into the path of the plane and a crash seemed inevitable. Sitting in the very rear of the open weapons carrier, I screamed a warning and jumped. The crescendo of roaring engines beat

in my ears, and the dark shape of the big bomber's wing passed a few feet over head. There was no explosion. A crash had somehow been avoided. I rolled onto my side and watched the B-24 settle earthward slightly, then climb away with its wheels [illegible]g outward into the wings. The pilot had pulled up just enough to clear the truck.

Dazed, I rolled on over in time to see the truck careen into the bank. Three men crawled out from under it. The other five lay sprawled on the strip where they had ironically bailed out of a truck to avoid a plane crash!

I often wondered what passed through the B-24 pilot's mind, seeing us sprawl in the dirt as he pulled up enough to mush over the truck. I might have found out the hard way except for that Clark Field incident.

Months later, at an airfield in Japan, I approached on final for a landing in an F-51 and spotted a jeep sitting at the edge of the runway. The memory of the B-24 flashed through my mind and I added a touch of throttle, just in case. At the last moment, the jeep moved across in front of me onto the runway. Too late to alter my approach, I pulled the stick back and nearly stalled out as I missed the jeep top by inches. Had I not added throttle when I first saw him, I would have hit him dead center.

FRANK TERRALL

St. Helens, Ore.

I HAD FLOWN UP FROM Clark Field in the Philippines to Yakoda in Japan to pick up a B-17 being transferred to our outfit. The B-17 wasn't quite ready so I had a few days to go sightseeing.

I had a friend in the Field Artillery stationed near the old Mitsubishi factory north of Tokyo. He told me they were firing a problem next day and he was to be the aerial spotter. He wanted to know if I would be his pilot. I jumped at the chance but warned him that recently I had been flying only heavy ships like the B-17 and B-29. I would have to get checked out in one of their *Cubs*.

One of the pilots volunteered to check me and we took off. I felt like I was riding a kite but, despite a stiff breeze, made some good landings. My instructor seemed to think I would have no trouble. He took me over to show me the field I was to use near the firing range.

The strip was 600 feet long and was built going up the side of a mountain with a 20 degree slope. It was impossible to taxi on the slope so the only way to land was uphill; then turn around and take off down hill. To top it off, on the downhill end of the strip sat a two-story barracks. After landing on 10,000 foot level unobstructed runways, I could hardly believe it when my instructor pointed out that tiny strip.

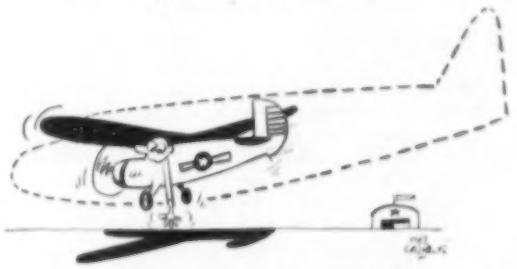
He made the first landing and came in "low and slow" over the crest of the barracks building. We made a controlled stall from the top of the building down to the strip, and came to a stop right at the end of our 600 feet. Considering our tailwind, I thought we had done a darned good job and wondered if I could do the same. He turned the airplane around and I took off downhill into the wind.

I didn't like the idea of stalling an airplane in from barracks height so, after clearing the area for wires, I tried a different approach. I came down between two of the barracks buildings and then, at the last moment, skidded the airplane over to line up with the strip. I still had a good 150 feet left by the time we had stopped rolling and was quite proud of myself—but my instructor wasn't. He said, "Never again, son. If you want to land here, come in over those buildings and not down through them. That's forbidden."

On my next landing, I still had a reluctance about stalling in from 50 feet—it isn't recommended in a B-29 at least—so, by the time I touched down, I had too much speed and too little runway left.

Now the first thing I learned as a cadet was that good pilots are never too proud to "go around," so my first reaction was to "pour on the coal." I was used to having 6,500 horsepower answer my throttle, but this time I only had 65 horsepower.

We started climbing up the mountain. Our prop and gear were just clipping the tops of the tall weeds and



grass. We couldn't gain a foot and we didn't lose a foot. This contest for altitude went on for almost three-quarters of a mile up the mountain side. We were in a very slight draw so we didn't dare turn either way.

By this time, my instructor had the controls. From the rear seat I could see a telephone line angling across our path. The poles were too close together to go between. We lost three feet of left wing to a pole, sailed across a 20-foot ditch and stalled out in a plowed field on the other side. Our wheels caught and very slowly and majestically we turned over on our back.

This was in 1946, and we still weren't too sure about the friendliness of some of the "backwoods" Japanese but, fortunately, some policemen found us and we got back without a scratch.

But speaking of unfriendliness—that Field Artillery C.O. went on a crusade to skin our hides, so I high tailed back for Yakoda and my safe old B-17.

FREDERICK W. HARTIG

Lakeland, Fla.

THE END OF OUR B-17 training at Gulfport was drawing to a close and weather was foul. My crew had completed all but one project, a thousand mile, night cross-country.

A series of unfortunate mishaps had befallen a number of B-17's during the last few weeks. We were all on edge. The night of our cross-country was raw and rainy. However, weather reported a ceiling of 1,200 feet which, of course, would be adequate for take-off.

Instructions were given and we proceeded to the long runway. I decided once again to check the engines. The only flaw was a spark that flew out of the cowling of number two. Then we were off. The altimeter indicated a bare 300 feet before we were in the soup.

While climbing to designated altitude, I glanced occasionally at number two engine. (*Continued on page* 74)

INTERVIEW with **GENERAL CHIDLAW**

By Gill Robb Wilson

AIR DEFENSE

FOREWORD

Few citizens realize the enormity of the problems involved in the air defense of the United States. Inherently, airpower is offensive power. To mould defense against it is a task without successful precedent.

To clearly summarize the task and reveal the airman's concept behind the effort, we here ask pertinent questions of the retiring Commander of Continental Air Defense Command — the man most responsible for our system of air security, General Benjamin W. Chidlaw.

For his studied and thoughtful presentation of the subject, the editors and, we trust, our readers are deeply appreciative. This article is not light reading but covers a subject of life and death to every man, woman and child in the nation. To the Department of Defense which facilitated security clearance for this interview, we express our appreciation.

THE EDITORS

Question: *General Chidlaw, please describe within the bounds of security, the composition, disposition, and mission of Continental Air Defense Command.*

GENERAL CHIDLAW: Defense of the United States from air attack is the mission of Continental Air Defense Command.

The Air Force has primary responsibility for Air Defense and is the executive agency of the Department of Defense for the Continental Air Defense system.

The Air Force furnishes interceptor and airborne early warning forces, and the basic ground network for surveillance of the air and control of all weapons.

The Army furnishes anti-aircraft gun and guided missiles forces.

The Navy furnishes radar picket vessels; will operate the Atlantic and Pacific early warning lines; and, in emergency, will furnish additional forces with air defense capability.

Other federal agencies cooperate with the Department of Defense to provide an adequate civil defense; to control civil air traffic; and to control radio transmissions.

We have divided the United States into three geographical regions, each region manned by a joint staff of the several military services: one with headquarters in New York; one in Missouri; and one in California.

Each region is further subdivided into sectors, each sector the responsibility of a joint air defense division. Twelve such joint divisions cover the entire country.

The function of air defense is divided into four basic actions: Detection, Identification, Interception, and Destruction. These four actions must be completed in less time than that required for an attacker to proceed from the point of his initial detection to his target.

Successful air defense starts with Detection. We have a network of radar stations covering large portions of the United States and Canada. There is also a network of radar stations in Alaska, Greenland, and Iceland. The U. S. permanent radar net is in a fully operational status, on a 24-hour per day schedule. This net gives us high altitude coverage over a large portion of this country.

Our joint Canada-U.S. radar net is expanding. In addition to ground early warning lines in Canada, we plan overwater coverage with airborne, as well as surface-borne, radars.

For detection we also have approximately 400,000 volunteers in the Ground Observer Corps. These civilian spotters cover the blind spots in our radar network and provide backup for our radar system. We are now expanding the Ground Observer Corps into all 48 states, which means a requirement for 1,000,000 civilian volunteers.

The second basic action, Identification, presents a great problem because of the amount of air traffic in the United States—about 30,000 domestic flights per day and some 600 daily international flights. The Air Defense system tries to keep track of all friendly aircraft penetrating the U.S. and those within certain critical areas.

A target track must be declared "friendly," "hostile," or "unknown." If within only one minute of initial detection the track is not correlated as friendly, fighters are

General Benjamin W. Chidlaw
Retiring Commander,
Continental Air Defense Command

dispatched. This occurs many times every day.

Our jet interceptors are capable of interception and destruction of a target in all weather. Squadrons are spotted for defense of critical areas. Fighters of other Air Force Commands, and of the Navy and Air National Guard, are available to Air Defense Command for emergency use. Certain Air National Guard pilots are currently standing daily alerts alongside our regular forces. The final phase, Destruction, is a function of either the rocket-firing interceptors, or the Army anti-aircraft batteries.

Army Anti-aircraft Command is an integral part of the Air Defense team and provides final rings of defense against enemy aircraft. Development of the first operational anti-aircraft guided missile, the *Nike*, was a long stride forward. Formation of *Nike* battalions is progresing steadily.

In addition to key industrial areas and population centers given "last-ditch" protection by this supersonic guided missile, battalions of 90 mm and 120 mm anti-aircraft guns are on guard around the clock in other vital areas. The *Skysweeper*, Army's first fully automatic anti-aircraft gun, is stationed at many air bases as protection against low-flying enemy aircraft. I thus cover briefly our mission of Detection, Identification, Interception and Destruction by a family of weapons.

Question: *Airpower is inherently a power of offense, and United States Air Force doctrine traditionally has set forth the cardinal principles of airpower in that light . . . (a) destruction of enemy airpower; (b) destruction of enemy resources which support the will to maintain war; (c) isolation of embattled enemy forces from reinforcement and supply; and (d) support of friendly surface forces. Now your command is required to cast airpower in a defensive role . . . its most difficult role. Doubtless you have evolved doctrine in this respect. Will you state the cardinal points of such doctrine?*

GENERAL CHIDLAW: The only reason we cast airpower in a defensive role is because we are forced to afford the enemy an initial advantage by our national tradition of never having struck the first blow. The enemy knows we will never strike first. We contrastingly do not know his intentions. This is a decided advantage to him in today's age of nuclear weapons. We must strive to be prepared to offset it.

Otherwise, our doctrine remains the same. We believe the very existence of our strategic striking forces has served, and now serves, to prevent the outbreak of a major war. In the opinion of many, this deterrent actually constitutes the balance of power between the free and the Communist worlds.

We must consider this strategic force as both offensive and defensive in character. On the one hand, it is our only means of going promptly and directly to an enemy's heartland for decision and ultimate victory by assuming the offensive. On the other hand, it undertakes a most effective defense of the United States against enemy air attack by destruction of enemy Air Forces at their source —in their homeland.

However, through desperation, an enemy might suddenly decide to rain destruction upon us—strike without warning. Against this possibility, the United States has had to present a complementary arresting device to the enemy's offensive capability—to protect the American homeland against the shock effects of a sneak attack.

So, we have been building and must continue to build a stronger air defense system to provide the best possible protection from such an air attack—protection of our people—our cities—our industry—and protection of our punishing punch which is the strategic air power of the nation. Only by this means can we hope to preserve the national population—the national will—and the means by which we ram war back down an enemy's throat.

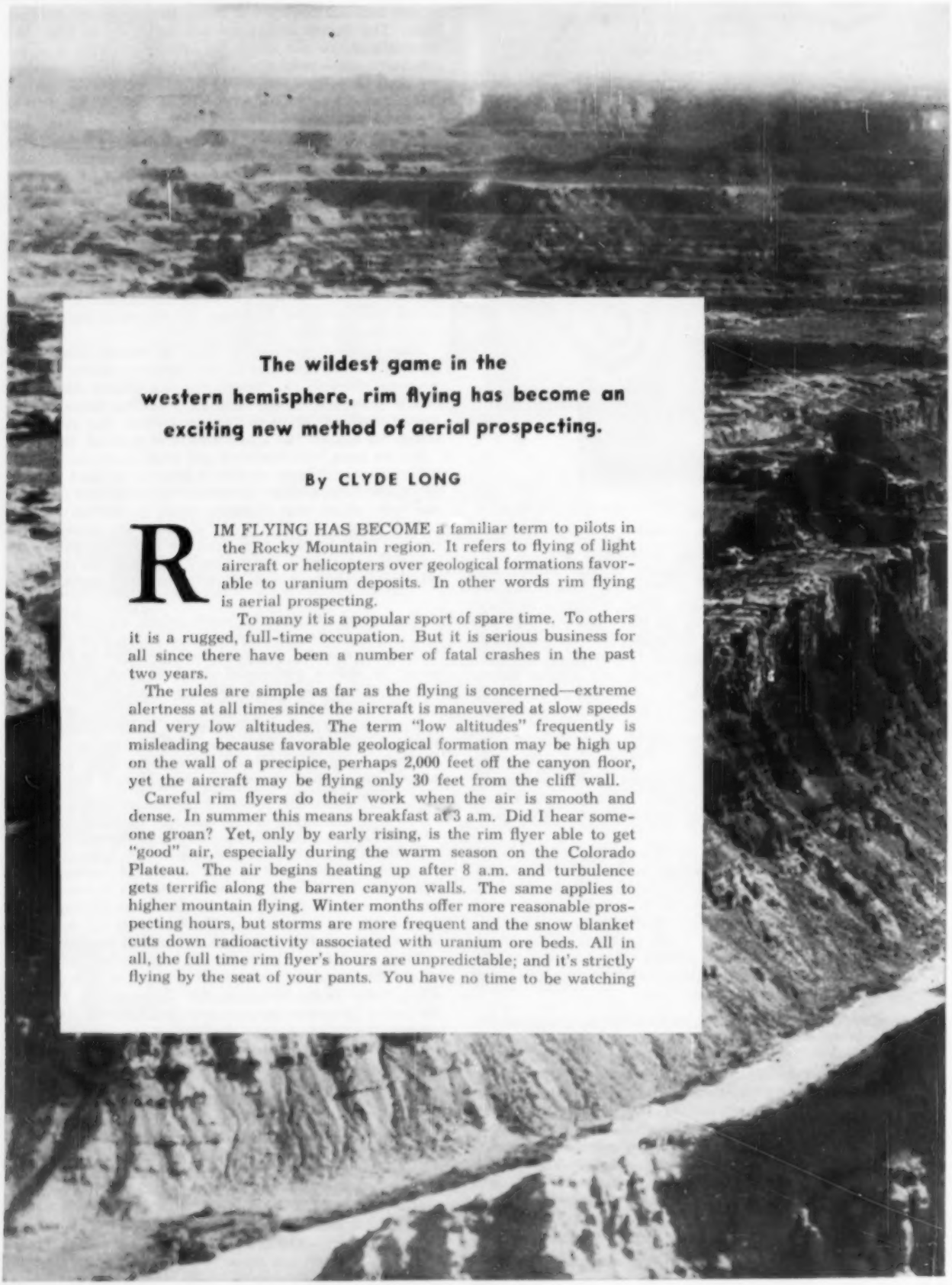
Question: *Successful bomb attack assured the defeat of Germany and Japan. Had the Luftwaffe been soundly directed, the destruction of England's power to sustain war would also have been certain. The history of defense against well conceived and determined air attack is far overbalanced in favor of the offense. Will you tell us how the air defense of the United States can be contrived to reverse the fate of Germany and Japan? Does there exist a yardstick to measure what degree of enemy penetration would be accomplished against our best obtainable defense?*

GENERAL CHIDLAW: The enemy should be forced to run a gigantic aerial gauntlet from his own bases to our areas of vulnerability. There is a big difference between *decision* at our borders and *beginning to fight* at our borders. The difference lies in meeting the enemy when he has been cut to pieces, rather than meeting him fresh and in full confidence.

True air defense, in my book, is the whole satchelful of defense capability which we possess in this country. First, there is the Strategic Air Command, a veritable Sword of Damocles hanging over the Kremlin itself. No enemy in a power position doubts that our SAC effort can bore its way to their heartland. This is a stay to enemy foolhardiness, and so a part of our defense.

Second, there are the Tactical Air Forces of this country and our allies in the North Atlantic Treaty Organization —fighter-bomber units of jab and short punch category —which roost right at the enemy's curtain. They too give a potential aggressor pause—another factor in our defense. Likewise, Navy's Carrier Task Force provides means from which offensive striking capabilities could be employed.

Third, Defensive Commands are alert on the approaches to this country—Alaska's bases on the northwest, Canada's in the center, and those (*Continued on page 49*)



The wildest game in the western hemisphere, rim flying has become an exciting new method of aerial prospecting.

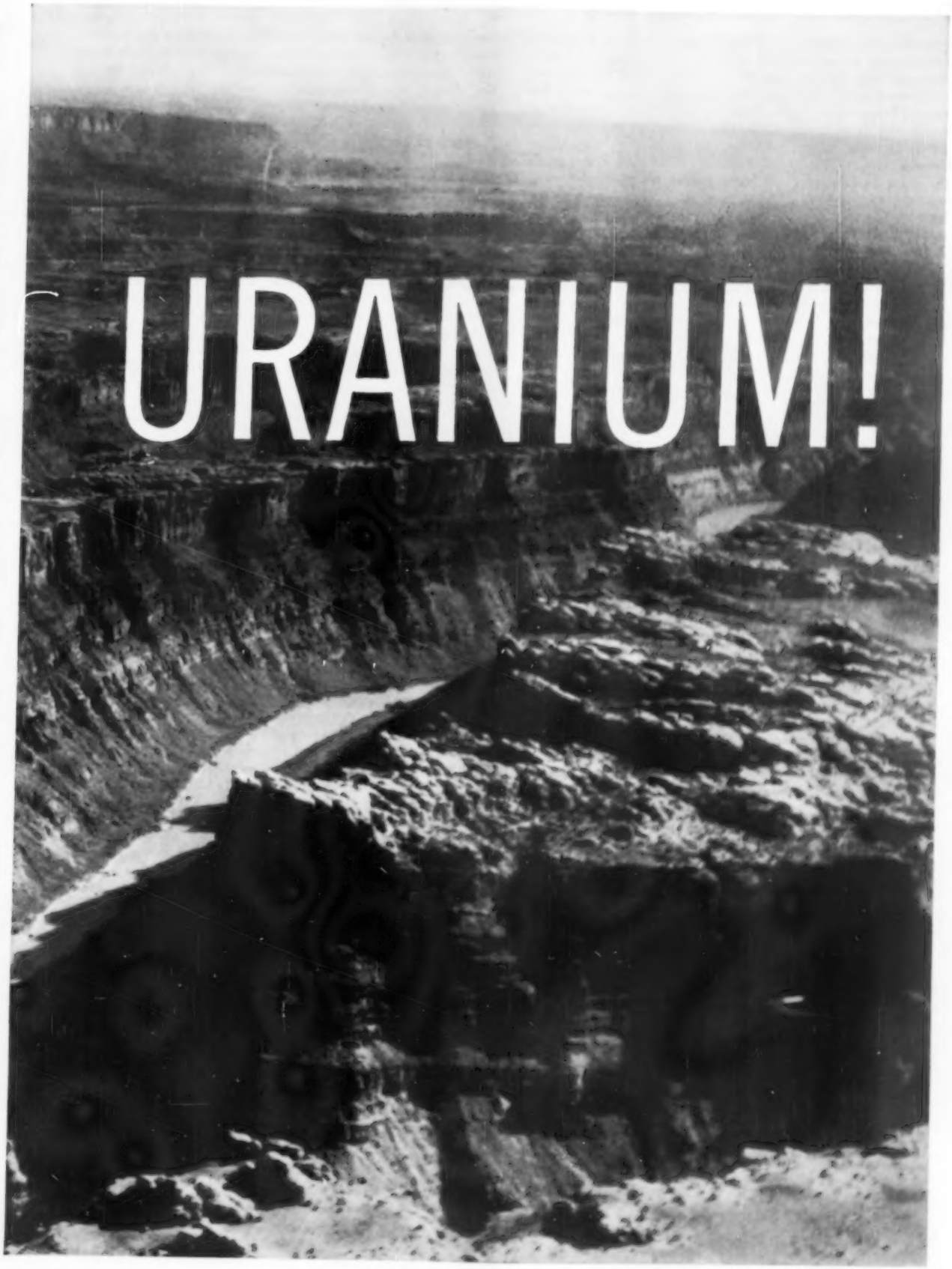
By CLYDE LONG

RIM FLYING HAS BECOME a familiar term to pilots in the Rocky Mountain region. It refers to flying of light aircraft or helicopters over geological formations favorable to uranium deposits. In other words rim flying is aerial prospecting.

To many it is a popular sport of spare time. To others it is a rugged, full-time occupation. But it is serious business for all since there have been a number of fatal crashes in the past two years.

The rules are simple as far as the flying is concerned—extreme alertness at all times since the aircraft is maneuvered at slow speeds and very low altitudes. The term "low altitudes" frequently is misleading because favorable geological formation may be high up on the wall of a precipice, perhaps 2,000 feet off the canyon floor, yet the aircraft may be flying only 30 feet from the cliff wall.

Careful rim flyers do their work when the air is smooth and dense. In summer this means breakfast at 3 a.m. Did I hear someone groan? Yet, only by early rising, is the rim flyer able to get "good" air, especially during the warm season on the Colorado Plateau. The air begins heating up after 8 a.m. and turbulence gets terrific along the barren canyon walls. The same applies to higher mountain flying. Winter months offer more reasonable prospecting hours, but storms are more frequent and the snow blanket cuts down radioactivity associated with uranium ore beds. All in all, the full time rim flyer's hours are unpredictable; and it's strictly flying by the seat of your pants. You have no time to be watching


URANIUM!

instruments, if you are to avoid the jutting rock or tree which may be around the corner. Rim flying is recommended only to airmen with considerable experience.

General rules can help the aerial prospector save his neck. First, take a good look at the terrain you intend to fly and from an altitude high enough to get a picture of its general layout. Second, be sure to fly down the canyon toward lower elevations. It is embarrassing to fly up a canyon and not have power to climb out of it when you come to a dead end. Most canyons are too narrow for turning around. Third, always leave yourself a way out, if possible, in the event of engine trouble or extreme turbulence.

Favorable formation outcrop may not be in a canyon. It may be on a hogback, in a "shear" zone or in a "fault" area in rolling, hilly country. Regardless of the type of country, the pilot should plan his work to provide maximum safety.

Flying difficulties can be increased by competition—the way mine were one day last year in Arizona. There were three light aircraft prospecting the same area close to the bottom of a canyon, myself included. It did none of us any good. Some kibitzing rival prospectors were sitting on the canyon's rim watching us with field glasses. They saw we had found something and staked the land before we were able to get back to it on the ground. This brings up a point in favor of the helicopter. However, in this instance, the country was so rough that not even a "chopper" would have been able to land near the favorable areas.

I have been asked many times what aircraft is ideal for rim flying. The lightplane should have a low stalling point with very good maneuverability at slow speeds, and good visibility. It must be strongly built or beefed up to withstand violent turbulence; be a good small field aircraft; be able to carry a goodly load; and have good high altitude performance with plenty of reserve power. Land elevations at which rim flying is done, vary all the way in the Rocky Mountains from 3,000 to 14,000 feet. Flying speed should not be over 90 mph, nor should altitude be over 50 feet above the ground. Of course, since terrain can be very rugged, it is hard to maintain an even speed or altitude. The helicopter has some features which make it more desirable for rim flying than the lightplane. However, its use becomes limited at higher altitudes and its original price is high.

Few persons outside the uranium industry realize the part airborne surveys have played in finding uranium areas of commercial potential. Perhaps the most publicized is the Black Hills survey in South Dakota where 18 of the first 20 operating uranium mines were located by airborne work. A major percentage of all Wyoming uranium discoveries were from the air as were the numerous discoveries on the Colorado Plateau and in New Mexico. The Atomic Energy Commission has played by far the largest role in airborne prospecting. It has had a full time fleet of light aircraft searching continuously for several years. Additionally, a few large mining and oil companies had the foresight several years ago to get in on the ground floor with full time airborne crews. They have been well repaid for their efforts.

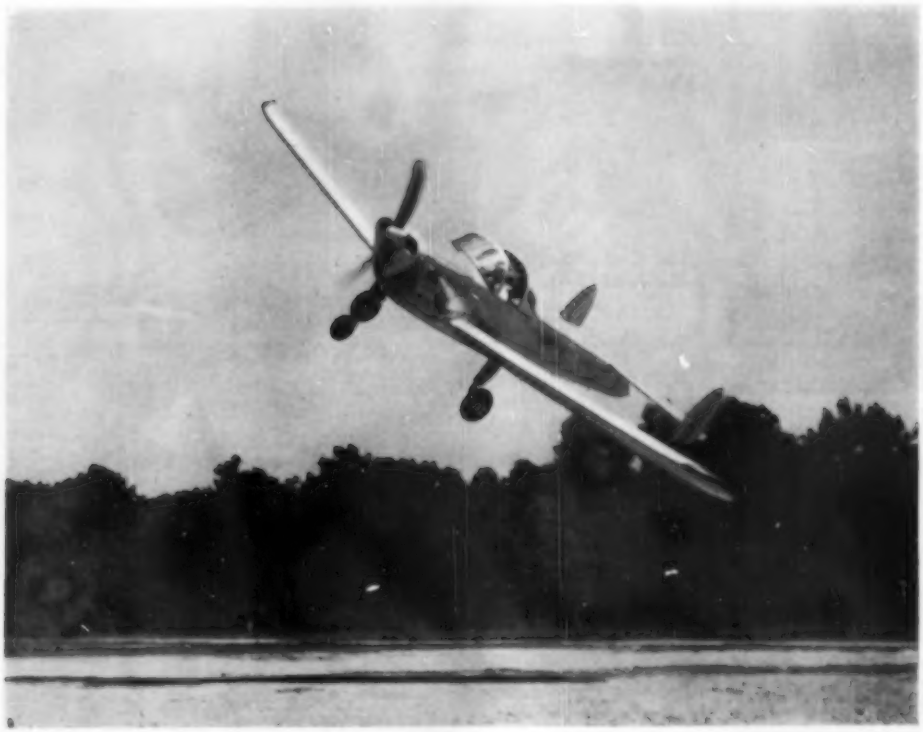
AEC crews are backed by the combined scientific knowledge of the U.S. geological survey and Atomic Energy Commission. The searches are meticulously planned and carried out by experienced men. They work at as constant a speed as weather will permit, month in and month out. This constancy has paid off many times. From a nation having little uranium reserve a few years ago, we have now moved to the front ranks.

What is the percentage of "finds" in relation to the hours flown? This is often asked. The answer depends on many factors—general potential of the area for uranium deposits; geological planning of the search mission; the experience and perseverance of search crews; and not least, the effectiveness of the detection instruments and other equipment used.

Some airborne units have discovered paying mines in a year's time. Others have discovered none. The percentage of finds for the full time operators, however, is very favorable. Needless to say, more and more of the country is being closely inspected by airborne units. However, when I hear someone remark that all the favorable country has already been looked at, it makes me smile. Just the Colorado Plateau itself is a mighty big place. And a detection unit flown at an altitude of 50 feet is only covering a width of 100 feet. Radioactivity readings are hard to interpret and it is easy to overlook or miss a possible uranium deposit entirely, if little of the deposit is near the surface. Large blocks of favorable regions of the Colorado Plateau have been claim staked without any indication of the presence of uranium. How much of that staked area has even been prospected is questionable. I know of dozens of so-called prospectors who have not inspected so much as the rim rock of their claims even though several are close to operating mines. This may seem incredible but I can readily cite numerous examples. The idea behind much of this claim staking is to sell the claims to someone else at a terrific price plus royalty and let the buyer do the prospecting.

Many claim vacancies exist even near some of the larger operating mines. Yes, they are hard to find. The average person who looks the country over sees numerous claim stakes and takes it for granted that the country is staked solid. Also, it is usually presumed (*Continued on page 75*)

The bottom of a canyon, provides a natural "hangar" for the author's *Cub*, used for aerial prospecting. Photo on preceding pages shows the uranium country in Utah.



". . . S-turns must be handled with great care. In a steep turn, altitude is lost faster than a pilot may realize."

THE PRO'S NEST

SPOT LANDING

although always important,

assumes new significance in the jet age.

By JOHN R. HOYT

IT SEEMS IRONIC to old-timers that, years after "spot" landing with power off was alleged to be "obsolete," it is more important than ever before. Jet aircraft must be "spot-landed" or the roll-off will exceed runway lengths and an over-shoot in a jet, with its slow acceleration, can be hair *razing*.

"So what?" asks the newcomer. "I'm not a jet pilot, and, as far as forced landings are concerned, I've never heard of an engine failure. Why practice power-off approaches when everybody, including the airlines, makes power approaches nowadays?" The best answer is that the pilot who doesn't know the basic rudiments of a power-off spot-landing is certainly not a pilot worth his salt.

A few Thumb Rules will make power-off precision landings much easier. And, although a good pilot doesn't fly solely by a set of rules, these do serve as guides by which a pilot can profit.

Let us suppose, then, that we must participate in the diminishing statistics of engine failures. We are at 3,000 feet and spot a likely field. Which speed shall we select for our initial glide? We want a speed that will conserve altitude, another way of saying we want to glide as far as possible. Then, when we reach the field, we want a non-float glide from which we can land precisely on a spot.

What *is* this speed? As readers of "The Pro's Nest" have noted, there are three speeds recommended for us private pilots: the Maneuvering Speed of about 60 per cent higher than the stall, an Over-the-Fence Speed of 40 per cent above the stall, and the absolute minimum speed of 20 per cent higher than stalling speed. But so far nothing has been said about a *maximum-distance* gliding speed!

Many pilots, who use the term "Normal Glide," mistakenly believe that this is also the best-distance glide speed. But if a skeptical pilot will consult curves for angle of attack and angle of glide, such as may be found in CAA Bulletin No. 26 (Aerodynamics for Pilots), he will find that maximum-distance gliding speed is neither the Normal Glide nor the Maneuvering Speed, but approximately the Over-the-Fence Speed! In short, he will glide 7 per cent farther at this speed than Maneuvering Speed.

If this is so, why should the faster Maneuvering Speed (about 60 per cent higher than stalling) be used in "normal" glides? Simply because it provides a margin of safety, permits maneuverability, and the penalty for error in maintaining the speed is not (*Continued on page* 54)

Old military planes were used on first Weimar-Berlin route.

First Civil airliner, the Junkers F-13.

The Dornier *Wal*, used for transatlantic mail service.

Twelve engines powered the Dornier DO-X.

The Junkers Ju-52, German counterpart of the DC-3.

Four-engined Junkers G-38 carried 34 passengers.

The Junkers Ju-90.

The Focke Wulf *Condor* FW-200B equivalent of American DC-4

The world family of great air fleets welcomes back an old and honored name in the skies–

Lufthansa

By MICHAEL GLADYCH

CRISSCROSSED BY THE WASH of modern airlines, the world has almost forgotten the emblem of formerly mighty Lufthansa—the German Flag Airline. But the German airman has not forgotten and now, after 15 years exile from the sky, Lufthansa is preparing once more to take its place.

Immediately after the nine-power pact was signed in London, in October, '54 restoring the sovereignty of German air space, Lufthansa set up headquarters in Cologne. To date, 12 American air transports (four *Convairs* and eight *Super-Constellations*) have been purchased. Officials estimate that at least 25 aircraft will shortly be required to implement projected services. Permission to carry out training within Germany was granted. Initial training took place under arrangement with British European Airways whose crewmen taught pilotage and other skills to former Lufthansa airmen called back to re-establish the airline. To begin with, Lufthansa reached out to the nearer capitals of Europe—London, Paris, Madrid—followed by service across the Atlantic to North America.

Because the future of Germany is so inextricably dependent on commercial transportation, and so inevitably

Lufthansa's *Super-Constellations* are used in transatlantic passenger service.

tied into world markets, we may expect to see the entire national weight of the free German government thrown behind Lufthansa. The airline may well become a vital link of the entire free world and a strong competitor of existing airlines. In view of this significance, it should be educationally helpful to set forth briefly the history of Lufthansa. It will aid us at least to estimate the national will behind the new airline, and show clearly that Germany has long evaluated her destiny in terms of air commerce.

When the airplane came of age at the close of World War I, France with her far-flung colonies, as well as the British and Dutch Empires, were quick to grasp the potential of air transport. The United States too had the length and breadth of her own country in which to develop air commerce. But where to all these, air commerce was a convenience—even a necessity, to Germany, in despair and defeat, it was a matter of life and death.

"Germans and Germany need air to live," said Dr. Hugo Junkers, one of the fathers of German aviation. "We need it to breathe. Air routes are the life arteries of our future." Dependent upon foreign markets and with only a token merchant fleet, Germany's salvation was in a world-wide air net. With tenacity, German aviation pioneers forced their nation to take to the air.

It was winter, 1917 and war still raged, when a group of German Air Corps pilots experimented with a new use for the flying machine—military mail. Rain or shine, their flimsy biplanes droned between General HQ in Duisburg and Eastern Front HQ in Crimea—a distance of 1,000 miles. Pilots gained invaluable experience in scheduled flying.

So successful was the wartime experiment that, soon after the armistice in 1918, a syndicate was formed to explore the possibilities of civil air transport. Limited by the Versailles Treaty, hampered by political unrest and lack of capital, the air transport group known as Deutsche Luftreederei (DLR), submitted a report that "the aeroplane should not be primarily regarded as a deadly weapon, which it undoubtedly is, but rather as an instrument of international understanding." The report went on to say, ". . . . the modern flying machines can compete successfully with land and water transportation."

Proposal to start an air transport operation immediately was strongly opposed by unimaginative members of the German government. The project might have been stalemated except for the pitiful state of the railroads. Decimated by war reparations, the German rail system was so inadequate that use of war surplus aircraft "as a supplementary measure and only a provisional basis," was reluctantly approved.

Chance to prove their case was enough for the DLR pioneers. On February 5, 1919, the first scheduled route was opened between Weimar and Berlin. Old, open-cockpit, observation planes were a serious handicap but passengers, even women, donned coveralls, helmets and goggles for the drafty, 140-mile ride. The enthusiasm with which the public used the new service decided the future of air transport in Germany. A second route, Berlin-Hamburg, was added and within weeks, a third link brought the industrial Ruhr within the air net. The government now granted DLR a mail contract. A surface letter took three days, Weimar—Berlin. The stipulation to DLR was that it deliver mail on the day of posting. But soon war-weary machines began to give trouble. Passengers' safety was at stake and DLR realized that, unless it could get new planes, the promising air service would be discontinued.

Answer to prayer came from the Junkers Works in Dessau—the half-way stop on the Weimar-Berlin route. Even during the war, Dr. Junkers visualized the commercial future of the airplane. Under difficult financial and labor conditions, he had worked doggedly on the first civil airliner—the F-13. This single-engine, four-passenger, all-metal cabin plane was a success. Cruising over 100 mph, it could operate from small fields; had ease of handling and economy of maintenance. Its first public flight in June, 1919 marked the origin of an aviation boom in Germany. Twenty-four foreign countries ordered the

plane and in Germany several independent operators mushroomed alongside the veteran DLR.

Not satisfied with internal success, German aviation pioneers reached far afield. Two years after its first scheduled flight, Deutsche Aero Lloyd, one of the larger new companies, made an agreement with Soviet Russia to form a Russo-German airline, DERULUFT, to operate between Koenigsburg, East Prussia and points in Russia proper.

The same year, Dr. von Bauer organized a German-Columbian Air Transport company in Bogota. The Sociedad Colombo-Alemana de Transportas Aereas (SCADTA) purchased F-13's, and German pilots, instructors and mechanics migrated to Colombia to train native personnel and form the spearhead of German air expansion in the western world.

Successful though they were in their foreign ventures, German aviation leaders faced a crisis at home. Forbidden by the Treaty of Versailles and the London Ultimatum Ordnances to operate out of Germany, the independent domestic air operators duplicated intra-German routes and cut rates. Chaos resulted. Business fell off dangerously and the three leading firms, Junkers Luftverkehr A.G., DLR and Deutsche Aero Lloyd, merged. Smaller operators were invited to join for the common good and on January 6, 1926 a new airline was born—Deutsche Lufthansa.

With a fleet of 120 planes and $50,000 capital DLH drew a plan of concerted action for conquest of world air lanes. The May 22, 1926, treaty with the Allies permitted Germany direct international operation. The first step of Lufthansa was to link the European capitals with Berlin. Paris, London, Warsaw, and Moscow soon enjoyed direct service.

Excellent service helped Lufthansa gain popularity in Europe. With larger airplanes on through routes, the line offered sleeper accommodation without extra charge. Padded seats were easily converted into comfortable couches. Elaborate meals were served aloft and complimentary ground transportation to and from airports was introduced. This pampering of "flight guests" as they were politely called, resulted in an 82 per cent increase in passenger traffic in the second year of DLH operation. Another enticement to air travel was low fares—equivalent to first class rail. Railroads, which by this time had rebuilt to become the leading rail service in Europe, failed to win back the air traveler. Even merchant shippers veered toward DLH air cargo which, in 1927, amounted to 1,413,163 pounds.

Increase of business resulted in orders for better planes to the expanding German air industry. Alongside Junkers, Dornier experimented with flying boats. Blohm and Voss developed large float planes which later took part in transatlantic service. Heinkel turned out a line of fast mail planes and Focke-Wulf worked on long range design. All of it was a coordinated plan of Lufthansa's global expansion.

Lufthansa was so named for sentimental reason. It was a tie of tradition with the *Hanseatic League* so dear to every German's heart. Back in 1221, a group of German merchants organized the Hansa League to protect their shipping from pirates and further their world trade. Direct sea and land routes protected by Hansa facilitated German conquest and colonization of the Slav nations. In their drive eastward German merchants reached Novgorod, Russia in 1229 where they established a strong base for further expansion. Seven centuries later, German Lufthansa followed a similar route east, except that the transport planes did not stop in Russia. From Berlin in July, '26, two airliners flew to Peking, China, to negotiate a direct link between Europe and the heart of Asia. The Hansa of the Middle Ages operated under the motto: "Freedom of the Seas"—its successor, DLH, modified the motto to suit the air age: "Freedom of the Skies." It was in following their motto that the German air merchants violated the Monroe doctrine and "invaded" the South American skies en masse.

In spite of stiff competition by Pan American, SCADTA of Colombia prospered with their coverage of 25 scheduled stops. Colombia's neighbor, Venezuela, proved a hard nut to crack since the country had been under strong French influence. Rather than waste effort there, the Germans turned to other Latin countries. And so, Lloyd Aero Boliviano flew the corrugated-skin Junkers over some 600 route miles in Bolivia. Air Lines of the Rio Grande du Sul and the Syndicate Condor Limitada, both sponsored by DLH, operated in the interior of Brazil. In Argentina, Aero Lloyd Cordobese served a 400-mile internal route and another Condor syndicate flew across the Andes.

Despite spectacular expansion in South America, the position of DLH was precarious due to lack of direct service to Europe. Pan American and Pan American Grace, competitors of DLH had already established trunk routes linking the American continents both through Panama and the Caribbean Islands. To counteract this, the Germans needed a through service to Europe. The existing transatlantic airship service (independent of DLH) was reliable enough, but costly and slower than an airplane service. Lufthansa wanted a long range aircraft capable of crossing the South Atlantic. German industry was unable to promise such equipment before the late thirties and DLH was forced to improvise.

This time Lufthansa turned back to its maritime tradition. Specially equipped merchant vessels carried flying boats from Africa to within 1,800 miles of the Brazilian coast. The planes were then catapulted and flew the mail the rest of the way. A similar (*Continued on page* 72)

Some of Lufthansa's crew members. Above: Pilots Anthony R. Marks, Dieter Lindner. Right: Air hostesses Christa Katge, Mascha Junge, Margot Rode.

The North Hollywood Optimist Club watches Fred Maw present Squadron's diploma to Bob Ostrom.

Dale Johnson clipping Clair Foster's tie just after the latter made his first solo flight.

Scouts rib-stitching wing of an Aeronca.

FLYING SCOUTS

Part of the advanced Boy Scout program, this Air Explorer Squadron owns its planes and flies 'em, too.

By CATHERINE RUCKER

IN SAN FERNANDO VALLEY, Calif., Air Explorers Squadron III, Boy Scouts of America doesn't just sit and dream of flying. The boys actually fly! Six of them soloed in two years and a half. Six more have finished dual and patiently wait the eligible age of 16 to solo.

This Squadron, ranging from ages 14 to 18, boasts of being first of its kind in Scout history to take up actual air work. If any squadron wants to challenge this boast, Squadron III will be more than happy to hear from them. The leaders and boys are hoping they will inspire other Scouts to fly.

It all started on December 17, 1952. Homer Hess, active in Boy Scout work, felt the urgent need for more Air Explorer units in the fast growing San Fernando Valley. He, along with a group of public spirited men of the Valley, sensed lack of motivation in the explorer program.

The Squadron started with three members and grew slowly at first. But soon word got around that this was one bunch of leaders who meant business in teaching scouts to fly. The Squadron began to grow with amazing strides. Today there is a long waiting list.

Fred Maw, Assistant Squadron Advisor, who works as a Los Angeles fireman, is a licensed flight instructor. He offered the Squadron free ground school classes once a week with dual instruction at the maintenance cost of his *Ercoupe*—four dollars per hour. This four dollars is supposed to come from the boys' own earning power.

Ray "Shorty" Gillingham, now the Squadron Advisor, owner of Gil-Fen Aircraft, donated a Piper J-3. This little *Cub* was a real boost to the Squadron. Shorty, with the help of the boys, put it in super shape.

Another asset to the Squadron is Jerry Detwiler, Korean veteran Navy pilot. He has sold safety to the boys' parents and keeps in personal touch with all.

Three more outstanding men who act as Assistant Advisors to the Squadron are Max Mahan, Bill Catlin and Max Ostrom, young Bob Ostrom's father. Then there is a committee of nine men, headed by Jack Hollebeke. Some of the committee members have sons in the Squadron, others are just civic-minded citizens with a mutual interest in American youth and aviation. The movement is sponsored by the North Hollywood Optimist Club. Lockheed gives the boys space for the Squadron to meet. San Fernando Airport donates tie-down space for the Squadron's aircraft. The National Guard and Civil Air Patrol lend films.

When a new member is initiated, he brings his Dad along the first time. Parents must give full consent and support to the boy. There is a six-weeks try-out period before the young Air Explorer's training starts to make sure he is anxious enough for air work.

The 14-15 age group have one hour of dual a month along with ground-school classes once a week. At 16, after ten hours of dual training, if the boy is thoroughly qualified, he takes the *Cub* up alone.

Returning from his flight, the young Air Explorer receives his solo license. The North Hollywood Optimist Club is on hand to present the diploma. Then the Air Explorer preceding him in solo has the privilege of clipping the blue tie of the soloer to preserve for Scout history. After solo, the 16-year-old starts his 40 hour flight period to earn his private license by the time he is 18.

Lately, the Squadron purchased an Aeronca *Champion* for $150. Bill Catlin, Shorty Gillingham and the boys will soon have it re-covered and airworthy. That will give the Squadron five planes—two of their own, and three belonging to instructors. There is also talk of buying a glider when the Aeronca is paid for. END

PIPELINE

Flying low over 700,000 miles a year in 23 states through all kinds of weather, "can be the safest flying in the world, if you just know how!"

AT MONROE, LA., THEY said, "Go out to Selman Field and look around. You can't miss Clair McMahan!"

They were right. Mr. McMahan is sizeable with a voice to match. He once caught engineers setting poles too close to a pipeline and circled around bawling them out from the air until they moved.

McMahan was inside his Stinson, which fits him like a hat. He said yes, he had fathered pipeline patrolling back in 1931, and who wanted to argue. I disappointed him.

Ben Comfort, head of the Mississippi River Fuel Corp., who first hired McMahan, says it was an argument that started the new industry. The big man had boasted that pipelines could be patrolled cheaper and more reliably by air than by foot, snowshoe, horse and jeep. Comfort needled him to back it up and McMahan did.

He had more difficulty convincing the insurance companies that their best interests lay in covering all-weather, all-seasons, all-terrains flying at 200 feet. Mac proved it by 25,000 hours logged in every type of American plane then known. Today, his insurance is as low as any commercial pilot in the country. The nine pilots of his patrol company enjoy a comparable record, with only two forced landings and one serious accident in five million miles of flying.

They fly without chutes. At 200 feet, they couldn't use them. "But my pilots rarely crack up," Mac said. "We have a job to do with good men and equipment. We do it."

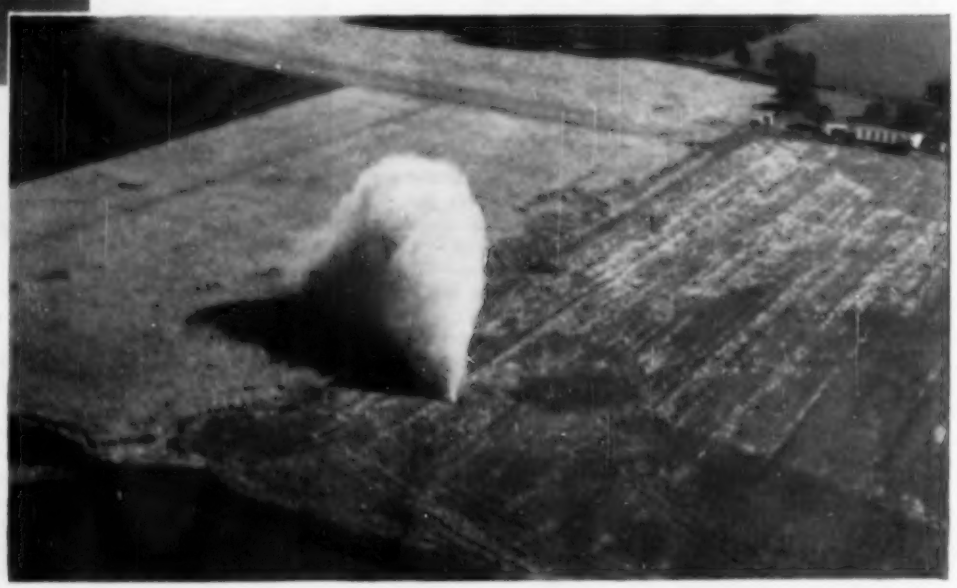
However, insurance companies and CAB eye this activity closely, in spite of the fact that pipelines are spreading faster than seasoned patrol pilots are available. That sounds like open opportunity, but it isn't. The business is so highly specialized that it is cheaper for pipeline operators to contract an outside patrol company—*McMahan's, that is*—than to operate their own patrol.

One pipeline tried to save the toll by operating its own patrols. It put in good planes and picked men, but costs within months were, one pilot kaput, one badly injured, two planes washed up and damage suits from landowners. The third pilot wisely quit. To McMahan, the answer was obvious. The pipeline should have contracted with him in the first place.

Just what distinguishes a good pipeline patrol pilot is difficult to determine. Barnstorming and contact flying is better training than speed flying. Yet some of Mac's boys have been jet jockeys while others with experience in crop dusting, surveys and forest-fire patrols did not seem to fit the pipeline art. Two pilot "musts" are an uncanny sense of orientation, and an indestructible ability to soak up hour after hour of acute, unflagging concentration. The low altitude, slow speed, and the sense of riding a private highway, has a tendency to lull a pilot to his danger. The pilot is also the observer. He has to note every foot and mile of right-of-way beneath him.

"How do they learn?" I asked McMahan.

"I pick 'em and teach 'em," he admitted modestly. He is quite sure nobody else could do as well. His record proves it. You can't win that argument.



Clair B. McMahan, who originated pipeline patrolling. Right: A pipeline "blow" is easily spotted by patrol plane. However, it can usually be prevented by early detection of leaks and danger signs.

Patrol planes fly their routes at 200 feet over all sorts of terrain without chutes aboard.

PATROL

By TOM McCLARY

Starting his own business was the result of the war. He hadn't minded ferrying planes across the Atlantic, but he wanted his own business. During his service absence, pipelines had been rushed to form a web from Texas to Canada; across rivers, lakes, mountains, and deserts. Infant companies had risked their last dime on construction. They couldn't afford "blows," with costly loss of service and expensive litigation.

McMahan came up with a typical McMahan answer. Blows shouldn't just be spotted quickly—most should never occur. Leaks and danger signs could be spotted from the air far in advance of trouble. It was simply a question of contracting *the right* aerial patrol. By rare coincidence, there was only one such company—McMahan's.

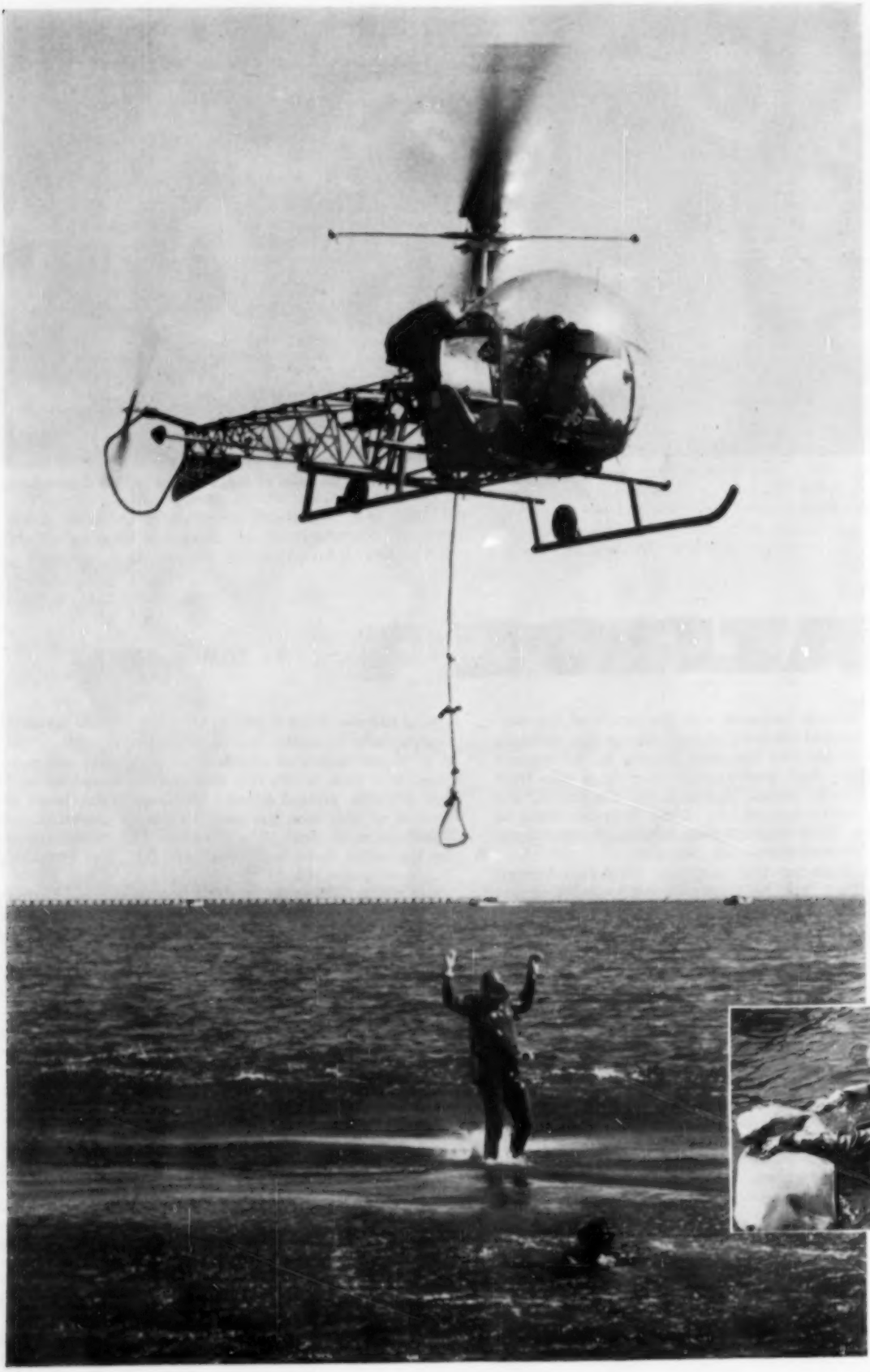
His first client was Ben Comfort again, who didn't quite believe him, but likes to hear Mac argue. With a basic contract in his pocket, he corralled other interlocking pipelines so that he could schedule his pilots and planes advantageously. His business theory was low-cost investment combined with maintenance that would lick the competition of part-time patrol costs. Purchase of nine Stinsons was his first expenditure, with an extra engine for each. Next he established the finest possible engine and overhaul shop. Now he was ready to talk economy in pipeline patrol.

His contracts are dependent upon individual factors and, being a canny Irishman, he wouldn't divulge his charges in any case. However, for comparative purposes, a coaxial cable can be patrolled by air for about 26¢ per mile as against $2 per mile by ground patrol. From the public service standpoint, efficiency is the greater factor. Pipeline troubles seldom originate along the line itself, the point of origin often being beyond the vision of ground patrols. Even where trouble has already occurred, it can usually be spotted much earlier from the air. Finally, in an emergency or after storms, one plane can check a length of pipe in one day that would require up to 70 men working ground patrol. McMahan established his theories so well that last year his planes patrolled over 700,000 miles of pipeline in 23 states. His record amazes the insurance companies who still feel that patrolling "ought to prove risky."

Mac snorts indignantly, yet this isn't forest patrol, where a pilot can reach for ceiling over the humps or fly around weather. A pipeline patrol crawls over the humps and snakes down through the gullies, and is on the bottom of every storm. Never-the-less, with 29 aerial patrol operators, there was only one fatality last year. The industry's real problem is not danger as much as observation-error. For instance, there were the "green" pilots who patrolled a rival company's lines six months before a blow on their proper patrol showed their mistake.

When Mac hires a new man, he takes him out on the long patrol, reaching clear from Texas or Louisiana almost to Canada. If the pilot "sweats out" to Mac's satisfaction, he flies with him for a solid three months of personal instruction. After that, the pilot gets six months patrolling "easy, flat country," where the worst that could happen is ploughing into some bayou or piling up in a prairie blizzard. Then the pilot gets a year over the whole circuit, orienting himself to local weather quirks and the mazes where various pipelines junction. By that time, they're really trained and ready to fly, Mac says. By which he means that he's ready—well, almost—to count on them without checking.

McMahan's patrols run like a fan out of Texas and Louisiana. They ran into west (*Continued on page* 70)



Above: John Hinch is followed by Army National Guard Capt. Francis Rooney during "scramble" at Zahn's Airport. Right: Dick Ferg (left) in full skin-diving gear, waits while Shirley Nelson is helped into her suit by CAP members.

Photographs by William Becker, Flying Camera, Inc.

When under-water search is necessary, air-sea-rescue units can call on these volunteers

FLYING FROGMEN

AS IF TO BALANCE the sedentary life of the great city at its western tip, Long Island reaches some 125 miles up the rugged Atlantic with a vast profusion of natural attractions. Rugged surfs, quiet coves, sandy dunes, brooding marshlands, spanking streams and scrub oak thickets set the stage for a diversity of sports unmatched elsewhere in a like area. And the addicts of polo, horse racing, motor boating, swimming, hunting, fishing, sailing, and flying make the most of it.

It is then in the tradition of Long Island to come up with new angles—hence the Flying Frogmen, organized under the aegis of Nassau County Wing, Civil Air Patrol.

Search and Rescue is a constant requirement around the bays and coasts of the New York Metropolitan area. Often the voluntary efforts of the amateur can stave off disaster or effect a rescue in support of the Coast Guard and other professional guardians.

It became apparent to CAP leaders on several occasions that their search and rescue efforts could have been more effective if they had been able to dive beneath the waters and bring up victims trapped by results of some accident.

Recruiting of volunteers with combinations of experience in amateur diving, water skiing, sailing and flying was no problem on Long Island. Available among the Nassau County Wing are helicopters, amphibians, float planes and a variety of boats and surface craft. The volunteers provide their own "frogmen" equipment.

With the helpful counsel of the Coast Guard and police authorities, organization of communications has been effected and a series of exercises has helped to smooth off the rough spots. The Flying Frogman unit is based at Zahn's Airport, near Amityville in Suffolk County.

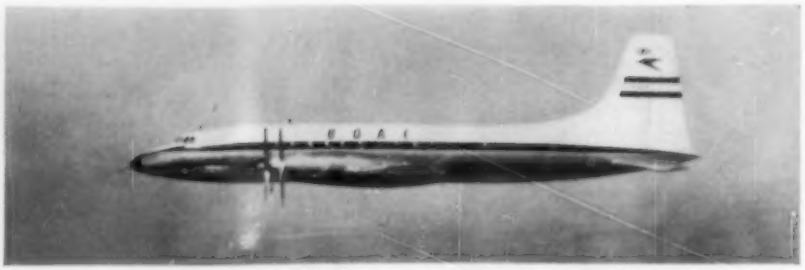
Opportunities for service are in the lap of the Gods but at least the Nassau Wing has placed itself in the path of opportunity and, in the interim, angels could do no more. END

Above: Lt. Col. Paul C. Halstead, CO of Nassau County Group, CAP, at controls of his Seabee. Below: Hinch entering Army National Guard helicopter piloted by Capt. Rooney.

Opposite: CAP volunteer, John Hinch, drops from copter in simulated air-sea-rescue. Inset: Salvaging "wreckage." Note aqualung on Hinch's back.

TURBO-PROP

Right: Due to enter service on international routes this year is the British Bristol *Britannia*, turbo-prop airliner capable of carrying up to 100 passengers between London and New York. Powered by four Bristol *Proteus* turbo-prop engines, the *Britannia* will be the first really big turbo-prop airliner to go into regular service. British Overseas Airways Corp. has 35 on order.



LARSON DUSTER

Left: Designed to replace the war surplus Stearman, the Larson D-1 Duster has many economy features. Everything from the firewall forward is surplus equipment, including 225-hp engine. Tires, wheels and brakes are standard new production automobile units. There are only 25 per cent as many parts in the plane as in a Stearman. There is no wood in the structure and no ball bearings. No brace wires are used. Ailerons are located in the middle of both top and bottom wings. The twin-tail group has no fixed vertical fins, the entire surface moving as a rudder. Maximum gross weight is 3,600 lbs, maximum payload 1,500 lbs. Wing loading is 11.4 lbs/sq.ft. Power loading 16 lbs/hp. Gas capacity is 30 gal, giving 2½ hours. Cruise is 90 mph, landing speed 40 mph. Takeoff distance, no wind and empty, is less than 200 ft. Rate of climb empty is 1,400 ft/min. Price, less power package and including hopper but no dispersal equipment, is $9,000. Prototype was flown last March and the Larson Aero Development Co. of Concord, Calif., is working on production plans.

XV-1 CONVERTS

Right: McDonnell's XV-1 Convertiplane is shown here making in-flight conversion from helicopter to airplane. The craft lifts vertically as a normal helicopter, flies forward until its speed exceeds the stalled speed of the wings. Power then is shifted from the rotor to pusher propeller and controls shifted from rotor to conventional. Lift is provided by the wings while the overhead rotor is allowed to windmill. The rotor is driven by McDonnell developed pressure jet engines at the tip of each of the three blades. The pusher prop is powered by a Continental reciprocating engine which also is used to drive compressors which supply air to the pressure jets during helicopter flight. Note pusher prop (right) is stopped, (below) is turning.

SKIMMER Above and left: The Colonial C-1 *Skimmer* is a three-place all-metal amphibian powered by a pusher-mounted 150-hp Lycoming. The plane features 80 per cent slotted flaps, retractable water rudder, and a nose wheel that acts as a bumper. Top speed at 5,000 ft. is 127 mph, cruising 115 mph, stalling 50 mph. Range is 700 miles at normal gross weight. Empty weight is 1,400 lbs, gross 2,100 lbs. Certification is expected this summer, with first production models available for delivery by the spring of 1956. Price is $15,750. Colonial Aircraft Corp. has leased a new building at Deerpark Airport on Long Island for production ultimately of one unit a week.

HAVE YOU SEEN?

XV-3 CONVERTS Right: A convertiplane based on an entirely different conversion method than the McDonnell XV-1 convertiplane shown on the opposite page, the Bell XV-3 has combination rotor-propellers, mounted near the wing tips, that tilt forward 90 degrees for high speed flight after takeoff. Conversion is completed in 10 to 15 seconds without slowing down and while still climbing. Bell Aircraft's Texas Division is developing the hybrid aircraft for the Army.

Capt. Banfe, a native of Chicago, has been flying for Pan Am since 1950. Prior to that he flew with the RAF, RCAF and U.S. Navy.

HO HUM— A RECORD

When all the chips fall in place, including the jet stream, you don't even have to try—it just happens.

By CAPTAIN CHARLES F. BANFE, JR.

CREW BRIEFING for Pan American's Flight 2 went off according to schedule. The emphasis was on the usual emergency equipment location and procedures. The cabin team was informed that the cockpit would make all navigation announcements; and to be sure to come forward before take-off to report when the cabin was secure, lifejacket demonstration completed, and the evacuation chute in place on the main cabin door.

Dispatch frothed with unusual enthusiasm. The jet stream was plotted 100 miles north of our track. The Dispatcher informed us that our Great Circle track would parallel the jet stream and, with some luck, we would find favorable winds up to 150 knots.

Pilots are by nature skeptics, so little ardor was shown by us. But Dispatchers have had some skepticism brushed off on them, so we were informed that the fuel load proposed was 1,700 pounds extra—over and above Paris—direct, Brussels as alternate, plus two hours.

Dispatch had worked out a Flight Plan from Idlewild along Victor Airway over Riverhead to Boston. From there we were to fly up the inside route over Augusta, Bangor, Moncton, Charlottestown, Stephensville, and over Shark intersection off the east coast of Newfoundland. Our track over the ocean was Great Circle to South Shannon Intersection and direct to the coast of France and finally, to Orly Field.

Our cruising altitude was to start at 15,000 until Augusta. We were then to step-climb to 17,000 until Moncton, and thereafter try 19,000. We would be over the ocean before we would be light enough in gross weight to climb to 21,000. The flight plan was 10:28 minutes and our DC-6B take-off gross weight was 101,000 pounds.

We took off on runway 23—a sign that the wind was in the west and good for us, climbed lazily over Long Beach, and set up our VOR receivers to Riverhead. By the time we passed Riverhead, we were at 15,000 with remarkable ease. We requested clearance from New York to continue our climb to 17,000. In this way we would be able to arrive at our cruising altitude sooner and take advantage of greater tailwinds.

By the time we crossed Boston, we were at 21,000 feet and seven minutes ahead of flight plan!

It *could* be explained by the fact that we had taken off at 6,000 pounds under maximum gross weight, and low outside air temperatures existed. Also the third factor was that our engines had only 300 hours of time on them.

The 16 passengers in the tourist cabin were basking in the lap of luxury with three seats for each of them. On the westbound flight we would have 79 passengers and 19 infants! This could have happened to them!

Over Moncton we were 12 minutes ahead of flight plan and, by the time we left the Newfoundland coast, we were sure that the jet stream was along our course. For one hour, our ground speed was 450 statute miles per hour!

Over the ocean we monitored outside air temperature carefully and scanned the cloud formation to the north for the jet stream. We passed directly over Weather Ships Coca and Juliet, and maintained within a half mile of track most of the way. Cumuloformed clouds were well beneath us and the stars shone like an inverted city at night. The flight was smooth and even. We crept ahead of our flight plan at every check point. Disbelieving such good luck, the navigator worked incessantly with the LORAN, Radio Altimeter, Periscopic sextant, Consol and computer, checking and rechecking.

Often on transatlantic flights any one or two elements of forecast work out beyond expectations. It might be that weather is better than prognosticated, or winds are stronger, or at power settings better airspeeds are obtained, but rarely are all of the forecasts bettered.

At South Shannon Intersection, we were 15 minutes ahead of flight plan. We called Shannon on HF frequency and asked for the record time to Paris from New York, as we smelled the sweetness of approaching the fastest ever time. They had no such information.

By the time we reached the French coast, we had obtained clearance to descend. South of Cherbourg we were indicating 230 knots with 2,000 pounds of extra fuel. Paris weather? We were charmed. It was CAVU!

We flashed by the Orly beacon, FNO, and entered the time in the log—10:15!

The active runway was 26L. From FNO we started our downwind leg at 2,000 feet and turned final at 1,000 feet. We touched down and Orly Tower directed us along the blue lights of the taxiway in front of the terminal.

Our luck was still holding. We were assigned the gate in front of the terminal which is always—but always—reserved for Air France and given to American carriers under only the most special conditions. Customs in France are looser than well-chewed bubble gum. We dropped our bags on the counter without inspection and went into Operations.

We were then informed that we had tied the world's commercial New York-Paris record, traveling the entire route at an average of over 350 statute miles per hour!

We landed with 2,000 gallons fuel in excess of Brussels as alternate plus two hours, gas we could have used to make even faster time if we half tried.

The truth is that we didn't try because we had no idea that all of the chips would fall in place. In fact, we did not even know what record existed. Ho hum. END

The author at the controls of "Zaddie's Rocking Chair," the name she has christened her *Ercoupe*.

Soloing at 64, this spritely denizen of the California desert proved that, "No one is too old to fly."

GREAT-GRANDMA AT THE THROTTLE

By ZADDIE BUNKER

As told to Don Downie

I TOOK MY FIRST airplane ride in an old Kinner when I was 44 years young. It was fun and I wanted to learn to fly right then, but they said I was too old.

Twenty years later I learned to fly. Recently I returned from a 6,200-mile solo cross-country trip to Kitty Hawk, N. C., from my home in Palm Springs, Calif. Prior to that, my longest cross-country solo was the 100-mile hop across the California desert to Blythe to fulfill the requirements for my private license.

Too old to fly! Not on your life! I was born in St. James, Mo., in 1887. I came to Palm Springs in 1913 after my husband and I saw that bonds had been voted to pave the road from Banning, 25 miles west, and it looked like a good place to start a garage. We had the first automobile in Palm Springs when there were only 25 white people in the area. That makes me a desert rat, but now I'm a flying desert rat.

When I was 63 I met Fred Smith, then a test pilot for North American. He told me, "No one is too old to learn to fly," and brought a Taylorcraft down to the desert on weekends to use for dual instruction. After several hours of dual, Fred had to leave the area and I was left without an instructor.

A few months later, that old flying bug began gnawing again and I drove to nearby Indio for some more dual. It seemed to me that I was good enough to solo, but the instructor wouldn't climb out. I found out a year later that my son-in-law had been talking to the instructor behind my back and had told him that he didn't care how much flying I did—just as long as I didn't do it alone.

To tell the truth, it made me just a bit riled up. I took my automobile and started making the rounds of the flying schools. The first question I would ask was, "Do you know anyone in Palm Springs?"

At the first two schools, either the flight operator or one of his instructors said, "Yes"—so I left.

Finally I stopped at the Tri-City Airport near San Bernardino. Instructor Mel Turnbow told me the only time he'd seen Palm Springs was from 5,000 feet.

We flew for seven hours and Mr. Turnbow finally asked, "Don't you think you can fly this plane?"

"What do you think?" I parried.

"I haven't touched the controls once since your first lesson," he answered as he climbed out.

That first solo was no particular thrill because I'd been flying so darned long dual—about 50 hours counting all unlogged time other pilots had let me fly their planes.

Shortly after solo, I bought a used *Ercoupe* and had the rudder control kit installed. I went up for my private license on my 65th birthday, after 65 hours of solo time, with "Pinky" Brier of Tri-City.

"You have had good instruction and have worked at it," said Miss Brier as she wrote out my ticket.

The huge ex-Air Transport (*Continued on page* 68)

No. 186

I learned about flying from that !

The break in the undercast turned out to be a dangerous "sucker hole."

By TED DUROSKO

THE CESSNA 170 WAS shiny and new. A local businessman had bought the ship to fly business trips, and now admired it in the late morning sun.

"Let's fly to Port Erie," he said. I agreed.

My friend climbed into the left-hand seat. He had soloed the 170 but at this stage always took along an experienced pilot or flight instructor on cross-country.

We took off from Mid-City Airport, Hudson, Ohio and headed for Port Erie, Pa. The sky was clear and the sun shining but we found the haze quite thick up to 4,000 feet. Climbing above it, we enjoyed a smooth ride and reached our destination in 45 minutes. By the time we finished a sandwich, it appeared the haze had lessened. The range station reported no weather otherwise between Erie and Cleveland. However, an 18 mph wind was blowing from the north and we were concerned with the type of air mass coming from across Lake Erie. Several times, in the past, I had run into sudden, unusual weather formed by warm or cold air masses arriving from across the relatively-warm lake.

We started back via Cleveland and as my friend had flown a regular navigation problem on his first leg, he suggested that he be allowed to "relax" and fly the coast line back. It would give him opportunity to do some sightseeing. I thought this a reasonable request and agreed. After watching his procedure during the climb to 3,500 feet and trimming the airplane for cruise, I loosened my safety belt and paying no further attention, began to study the manual for the 170.

"It's getting stinky," he said, his face close to the windshield. Ahead, the haze had grown darker near the ground. It appeared to spread out in a flat plateau over a small community known as Fairport, Ohio. This town has several industrial plants which usually pour out quite a bit of smoke, so we reasoned the smoke had combined with the haze to create smog.

"Let's climb over this," I suggested, "the Cleveland weather sequence reported a four mile visibility so this stuff must be just local." Jack nodded and applied power for the climb. Puffs of the stuff darted past the windshield as though we were skimming through the top of it. Then suddenly we found ourselves inside the mass of it. The Cessna apparently hit a downdraft and plopped into the smog.

Jack's first reaction was to execute a 180. He wheeled the Cessna sharply; the left wing dropped about 70 degrees and the bank-and-turn needle shot past the "L." The Continental wound up and snarled in a high pitch. Instead of a medium bank turn, he had put the ship into a steep spiral. At this point, I took over and recovered to a one-needle-width turn. When the compass came around to east. I stopped the turn and held a level attitude. Within several minutes we broke out of the smog at 2,000 feet.

Once outside the heavy stuff, we realized we had run into something more than a local condition. The thin haze under us was rapidly solidifying into white, flat clouds. These in turn were uniting and forming an undercast. This certainly was unusual to me—at 2,000 we were on top! Left and right, the holes began to close. To the rear, the original direction of our course, was a high wall of dark clouds.

I tuned in the Erie Range. (*Continued on page 77*)

Air Defense

(Continued from page 31)

in Greenland, Newfoundland and Labrador on the northeast. This is a formidable obstacle course for any enemy to run.

Having all these initial defenses, we then start with the "last ditch" department—the Continental Air Defense system. This system finds strength in the fighter interceptors of the Air Force—in the guided missile and gun battalions of the Army—in the picket ships and augmentation forces of the Navy. On top of all this, is the tremendous potential of Reserve and National Guard units, which have their assigned slots on any D-Day.

In this way, the air defense of the United States is contrived to reverse the fate of Germany and Japan.

There exists no yardstick, as such, by which to measure what degree of enemy penetration would be accomplished against our best obtainable defense. There are too many variables involved. Obviously, if an enemy struck in perfect weather and in moderate numbers, we'd do a most creditable job of cleaning him up. Bad weather and a tremendous mass of enemy planes might give our best obtainable air defense a hard time. Given what information we could normally expect from intelligence, detection systems, weather people, etc., we can determine by war games a fairly accurate estimate of the degree of penetration that would be accomplished against us.

Question: *In view of the "surprise" potential of airpower, do you envisage that air defense throughout the foreseeable future will be a cardinal requirement of military science to every sovereign nation? If such is the case, do you feel that emphasis on development of air defense may close the gap between offensive and defensive airpower?*

GENERAL CHIDLAW: I believe that it will be. In fact, I believe it is now a cardinal requirement for the United States. Because of this "surprise" potential of airpower, our air defense must provide initial warning and protection for our own offensive striking forces. Any defense system which fails to provide warning time and air protection of our vital retaliatory capability is not fulfilling its mission.

Secondly, every sovereign power must have an air defense system to provide sufficient protection for the nation's economy—its industries—to assure sustained support for military and industrial warfare.

Last, and not least, it must have air defense sufficient to assure the people's physical and psychological ability to carry on operation of their industrial and military machines. In my book, this is perhaps the most important reason for air defense. It would seem of little purpose to protect our military forces and industrial potential, if, while so protecting, we accepted such destruction of population that our people were unable or unwilling to fight back.

It is difficult to predict that development of air defense will completely close the gap between offensive and defensive airpower. A defense system must be one which can be established within the economic capability of a nation to sustain a combined offensive-defensive survival force. In view of the magnitude of our country's air defense problem, it is well within the realm of possibility unwittingly to design a purely defensive system at the expense of the offensive effort. But there would be little purpose in any sovereign nation building a defense system so elaborate that its cost would either bankrupt the nation or deny it an effective offensive force.

Question: *In the evolution of military science, is it not true that comparable defense eventually has been contrived for each new offensive weapon; and that unless we move swiftly and with determination in air defense techniques, we might find our power of mass retaliation blunted by enemy air defenses and ourselves left vulnerable?*

GENERAL CHIDLAW: That is true, and I may add that, unless we move swiftly and with determination in air defense techniques, we may find all our power blunted by a mass atomic strike even before our retaliatory striking force could get off the ground. We must constantly evaluate and change our forces to match any increases, or possible decreases, in enemy strength. Beyond that we must use weapons available today to meet today's threat, while at the same time developing weapons foreseeable to meet tomorrow's threat.

Question: *This being the case, is it then true that those civilians who devote themselves to civil defense and to the air raid warning service are playing a vital role in prevention of war, as well as in air security?*

GENERAL CHIDLAW: Definitely. Within my observation there has been a tremendous increase in the awareness of the American people that their role in air defense is an essential phase of national policy to wage peace and assure survival. Let me mention our Ground Observer Corps people as an example. As of this date, there are approximately 400,000 civilian volunteers in the Ground Observer Corps. They spot planes from more than 13,000 posts, and man 49 filter centers. I cannot praise their patriotism, persistence, or patience too highly. They are an example to everyone in public service. Most Americans realize that todays wars are fought by the people as a whole, not merely by military forces. They know that civil defense programs must go hand-in-hand with military programs to prevent war, or to survive if war comes.

Question: *Would you say that Strategic Air Command and Continental Air Defense Command stand in contrasting or in complementary roles?*

GENERAL CHIDLAW: I feel, as do all military commanders, that little has altered the old military truism that, "the best defense is

(Continued on page 50)

PRESIDENT'S PLANE

PRESIDENT EISENHOWER and his pilot, Lt. Col. William Draper, stand in front of the Chief Executive's new Aero *Commander* which will be used for short trips. In 1910, "Teddy" Roosevelt became the first man who had been President of the U.S. to go up in an airplane, when he made a flight with Arch Hoxsey in a Wright biplane. President Eisenhower has now become the first President to use a light aircraft for executive transportation.

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(Continued from page 49)

strong offense." A purely defensive system alone would never deter an enemy decision to strike us. I feel that Strategic Air Command and Continental Air Defense Command stand in complimentary roles.

Question: *Our friends in Europe are always pointing out how much more vulnerable are their cities than those of the United States. This seems a half-truth. Attack on any NATO country would draw American reprisal by virtue of NATO pacts. Any enemy planning conquest of Europe would first need to destroy American retaliatory power. Defense of North America appears as vital to the people of Europe as to the American people. Only so long as the United States is secure can Europe be secure. Would you care to comment on this point?*

GENERAL CHIDLAW: Those who understand the tactics of our potential enemies know they are past masters at lulling nations into a false feeling of security; and that the Soviet might strike from the calmest of international relationships to gain maximum surprise. Those who know the Kremlinites for the realists they are—know they would never make the mistake of first engaging our allies and leaving us alone. Instead—in my humble opinion—we stand the most likely chance of being hit all-out in a mighty aerial blow as their first act of aggression.

Question: *Is there any way to rate the possibilities of enemy attack in contrasting methods such as by long-range bomber, or atomic missiles from submarines, or inter-continental missiles?*

GENERAL CHIDLAW: We know the Soviet Union has copied and improved upon our WWII B-29, and has built more than a thousand of these improved planes. We know that this airplane, stripped of equipment, except for navigation and bombing gadgetry, has the range to reach all principal targets of this country.

We know the USSR has still better and still faster planes under development and test and has flown long-range jet bombers which indicate the seriousness of her intentions. And we know that the USSR has created explosions of thermo-nuclear devices. Today the Soviet Union has capability to attack us through the air with weapons of great destruction.

I don't know about the possibility of using submarines but, since we know that the Russians have the A-Bomb and the submarine, we must grant them capability of dispatching atomic missiles from submarines in the near future.

In the future also is the cruising missile, a variety of unmanned bombers with speeds two to three times that of sound. Then will follow the ballistic missile, an intercontinental weapon which is within the capability of the Soviet Union by drawing on the brains of its captured scientists and their protégés. This wea-

(Continued on page 52)

AIR FORCE ACADEMY ARCHITECTURE

Keynoting the Cadet Academic area of the U. S. Air Force Academy north of Colorado Springs, Colo., will be the peaked, modern Chapel, above right. On left is the Cadet Social Center. Below is a model of full campus.

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(Continued from page 50)

pon can be figured to approach the Mach 10 to Mach 20 speed range—in other words, from Soviet launching sites, not much more than 30 minutes to any target in our country.

Our scientists must outdo these possibilities believed to be shaping up in the Soviet Union, and, in the meantime, come up with interception, or neutralizing devices which will head off and destroy the enemy weapon before it is well on its way

Question: *The bulk of public information on air defense has been focused on our northern perimeters . . . for obvious reasons. What about the "soft under-belly" of the United States?*

GENERAL CHIDLAW: We are concerned about the ever-increasing range capabilities of modern aircraft and the advantages to an attacker of making simultaneous approaches from many directions—including the "soft under-belly." In building our air defense system, it has been necessary to do "first things first." Our warning and defense system has been oriented initially against attacks by the shortest routes—that is, over the pole. Ocean areas are much more difficult to cover. We are now implementing plans for "all-around" protection.

I think you will agree that to hit New York City, a logical route to avoid defenses, would be from Murmansk over the water, avoiding Greenland and Iceland, and skirting Newfoundland. But most people don't realize that the distance from Murmansk to New York City is the same as from Chukotski Peninsula—opposite Alaska—skirting Alaska to the south, staying out of reach of our California radars, crossing lower California and the Mexican border, and proceeding all the way to Oklahoma City.

Furthermore, the prevailing winds are west to east, thus providing tail winds to western approaches, shortening time of flight and extending range. In addition, the jet stream phenomenon causes predictable narrow bands of from 100 to more than 200 knot winds at altitudes somewhere between 20 and 40 thousand feet, travelling generally west to east. We have taken all these factors into consideration and are currently implementing air defense measures throughout the southern states so that within a short period of time there will be no "soft under-belly."

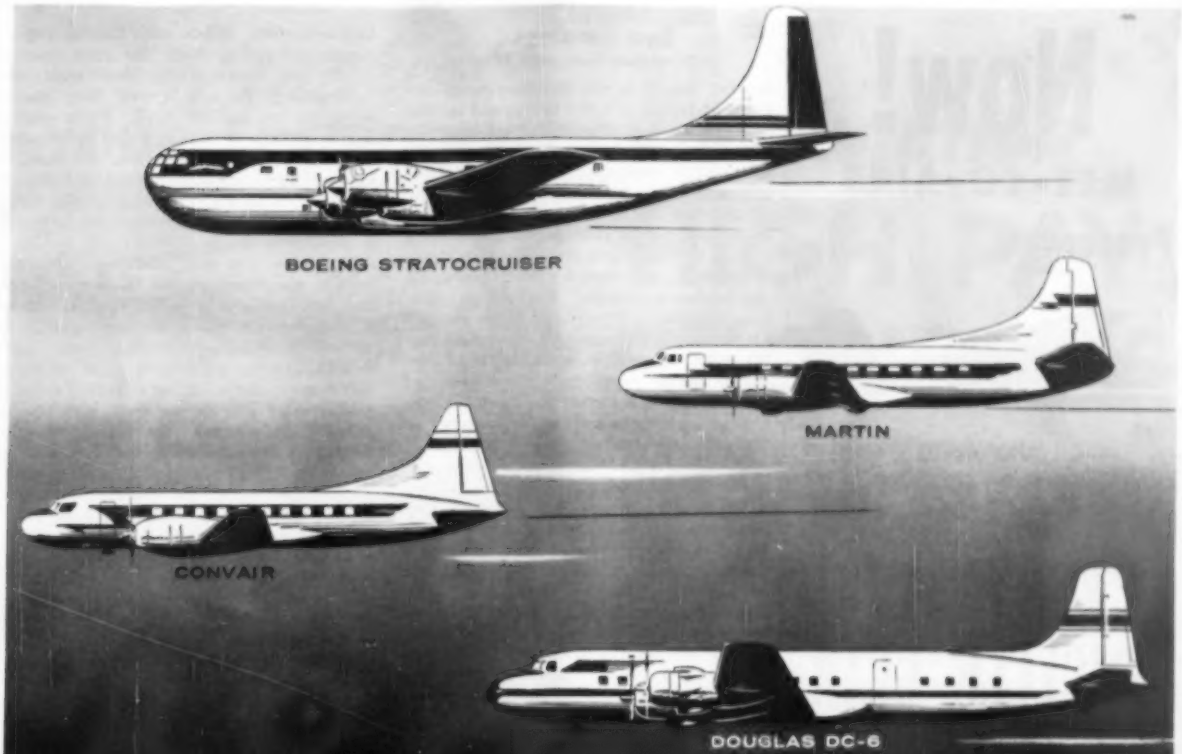
Question: *In the United States are some 60,000 airworthy civil aircraft of lighter types and civil pilots capable of manning them. A few handfuls are engaged in Civil Air Patrol but the vast bulk is uncatalogued, unorganized and unchallenged to participate in the National security. Should national crises arise, this fleet would almost surely be immediately grounded . . . a vast waste of a potential valuable asset. Even now the potential of this group is wasted because it is not voluntarily organized to mould essential public opinion in vital matters of air security. Could not Continental Air Defense Command or some other command draw effective support from this dormant resource and assign tasks commensurate with its aggregate patriotism skill and availability?*

GENERAL CHIDLAW: I judge this would be a matter for the Civil Aeronautics Administration and the Federal Civil Defense Administration to resolve. I realize the inherent value of these civil aircraft and pilots in moulding public opinion and agree with you that they should be utilized in this respect. In the matter of assigning M-day tasks, it would not be possible within Continental Defense Structure because of the complexity of our equipment, the training involved, and the specific nature of our mission. These planes could be used for civil defense emergency work but that is out of our hands.

In the event of a sudden national crisis, our problem would be to clear the air as much as possible so as not to overload our detection facilities. To have a volume of friendly planes intermingled with enemy aircraft would severely overload the air defense systems. END

WHOOOOOOOOOSH . . . . . .

It took just 3 min. 18 sec. for Air National Guardsmen to refuel Lt. John M. Conroy's F-86A *Sabre* when he stopped at Leckbourne AFB, Columbus, O., on the return half of his coast-to-coast 11 hour 33 minute round trip record flight. Refueling was done while the engine ran, then whooosh . . . he was off.



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Spot Landings

(Continued from page 35)

drastic. But it is *not* the maximum-distance glide, nor is it the best speed for the final approach in a precision landing, because the gliding distance is shorter; is followed by excessive "float" at the flare-out; and is accompanied by a ballooning effect when the stick is pulled back. This is another way of stating that the sinking rate is neither rapid nor constant.

The most important factor in power-off approaches is airspeed. Holding an accurate airspeed is 90 per cent of the answer. To be sure, judgment is the over-all factor, but that applies to all flying. Airspeed is the controlling factor in this maneuver and, without knowledge of how a varying airspeed affects accuracy, an accurate power-off landing is impossible.

Our first chore then, is to take the plane to altitude and find the stalling speed with power off, without flaps. Observe the indicated speed and do not correct for either altitude or temperature: these factors will largely take care of themselves. Add about 60 per cent to this speed for your Maneuvering Speed, 40 per cent for the Over-the-Fence Speed, and 20 per cent to obtain the minimum or "Never Subceed" Speed.

At this point a word of caution is in order: the novice must *not* attempt to practice this approach without a qualified instructor. Pilots with limited experience are apt to vary the glide excessively and descend too low over an "emergency" field to "prove" they could have landed in the field. Even experienced pilots should not descend lower than 150 feet in this practice, but should execute the actual landing at a recognized runway. If it isn't obvious, at 150 feet, that the shot has been successful, nothing is proved by going lower.

So there you are, and here we are, with a simulated engine failure at 3,000 feet, picking out a field. We can glide almost six miles in the average lightplane under no-wind conditions from this height, but we must save some altitude for the approach. After selecting a field within easy gliding distance, let's use a speed slightly faster than Over-the-Fence Speed for our maximum-distance glide, a speed about 58 to 60 mph in a plane that stalls at 40 mph. We should try to get above the field at a minimum of 1,000 feet and estimate the wind velocity and direction. Then we may establish our pattern as desired: circular, triangular, or S-turns downwind from the field—each has its merits, but we *must* stay close enough so that if we turn toward the field the nose would appear to obscure its center.

In the average lightplane (and each pilot must know his airplane and modify

(Continued on page 56)

CAP CADET SCHOLARSHIP

A FULL, FOUR-YEAR aeronautical engineering scholarship to the Massachusetts Institute of Technology, to be awarded annually to the top Civil Air Patrol cadet selected by a special scholarship committee, was announced at the annual conference of the National Board of the Civil Air Patrol by Mr. Bernard G. Davis, president of the Ziff-Davis Publishing Company.

To be known as the "William B Ziff Memorial Scholarship," the award is given in memory of Mr Ziff, deceased partner in the publishing firm and one of the nation's great believers in air power.

In making the presentation, Mr. Davis cited the fact that the United States will graduate about 27,000 engineers in 1956 while the Soviet Union will turn out 45,000, as ample proof that we have begun to lose the technological race with the Communist world.

Mr. Davis expressed the hope that the William B. Ziff Memorial Scholarship would set off a "chain reaction" of similar scholarships in which ultimately every aviation corporation and allied industry in the United States will participate.

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(Continued from page 54)

these Thumb Rules accordingly), the Maneuvering Speed will land the plane beyond the center of the field because of the abnormal "float" after flare-out. The Over-the-Fence Speed will land it slightly beyond center, and the Never Subceed Speed will land it on, or short of, the spot. In the "good old days", when spot landings were made for prizes, the winners often used very slow gliding speeds, at which their sinking rate was so high that if they aimed for a spot they could practically leave their landing gear right in it.

For our final approach, therefore, let us use a speed slightly less than the Over-the-Fence Speed, say 52-54 mph, in our plane that stalls at 40 mph indicated. Let the experts laugh at this for being conservative, but we are playing it safe and we have a trick up our sleeve, as will be shown in a minute.

Having established our glide, we must decide whether or not to lower the landing gear (if it is a retractable gear). In an actual landing in a very rough field, it may be better to leave the gear up and to use the slower, full-stall landing rather than a tail-high, faster, wheels-first landing. The flaps, if any, are a valuable aid, and it is preferable to start with one-quarter flap for reasons of stability and to increase and stabilize the sinking rate. Flaps will alter the exact airspeed to use, but the change is not enough to call for further computation, which might be more confusing than helpful.

Next, regardless of the pattern you prefer, estimate the wind velocity while flying the base leg. This is important because, if we have to crab to maintain our position, we know that we must turn toward the field sooner than if we hold position without crabbing.

At this point, we enter the crucial stage of the maneuver. We turn toward the field from our close-in base leg so that the nose apparently obscures the center of the field. We now have several "tricks" to use so that we can land on the near edge of the field (there are no silly rules to observe such as once plagued us during flight tests). We can slip, add flaps, or S-turn. We may also change or "play" our glide speed. About the only thing we cannot do in an actual forced landing is to add power!

Watch the nose. If it apparently moves forward we are overshooting, while if it moves downward from the spot, we are undershooting. (It is obvious that this method takes the wind into account, but it will not compensate for a change in wind velocity at ground elevation.) Suppose we are overshooting. In addition to S-turns or adding more flap, we can "play" the glide, which means that by raising the nose slightly until the airspeed is 10 per cent less than 54 mph, we will sink more rapidly and undershoot. Or, if we are undershooting, we can lower the nose until we have 10 per cent more speed, or about 58 mph, which will bring us closer to the maximum-distance glide and also provide us with "float" when we flare out near the ground.

It is absolutely mandatory to hold the

glide speed accurately. It is the only control of accuracy we have. We *must* have a constant sinking rate without any ballooning effects, and this is attained with safety only at a speed just less than the Over-the-Fence Speed. We must also fly by listening, seeing, and feeling rather than by watching the airspeed indicator all the time. Use the airspeed indicator as a check, not a monitor.

With plenty of altitude to play with, and always trying slightly to overshoot, we now have our remaining aces: full flaps, the S-turn, and slipping. Slipping a modern plane is not too easy or too advisable. Flaps and a gentle S-turn are preferred. Also it must be remembered that we are gliding at a speed slower than Maneuvering Speed, so S-turns must be handled with care. In a steep turn, altitude is lost faster than a pilot may realize. The stalling speed is higher, and there is no margin for error in a slow glide-speed.

If you do not have flaps, use the S-turn, the slip, and play the glide. If you do have flaps, use them, but remember that the immediate effect of applying flap is an apparent increase in gliding range. But soon the gliding speed falls off and the nose must be pushed down to overcome the added drag. Thus we land shorter than we would have without flaps. There is one exception to this. When close to the ground, we can add flaps and land a bit farther than otherwise because of the sudden, added lift. However, we have not gotten something for nothing because the landing speed is lower, the roll-off is shorter, and the total distance travelled has been reduced by drag from the flaps. Also, if this method has been used to hop over a tree, the pilot must be prepared to use quick technique in flaring out beyond the tree! To use flaps to stretch a glide from, say 100 feet altitude, is foolish and hazardous. The only way to stretch a glide is to "play" it, as described above, by going from less-than Over-the-Fence Speed to a speed 10 per cent faster.

Once the field boundary is passed, the plane will soon land because there is little float, no ballooning effect, and yet plenty of control.

Finally, it must be emphasized that the percentages should be modified for each airplane, and that a Thumb Rule is a guide only. Remember that a Thumb Rule or percentage figure won't fly the airplane for you. The *principle* holds good for all planes—it may be taught to students—but the actual speeds used must be modified according to the skill of the pilot and the stability of the airplane. And, whatever else, do not practice "shots" at small pastures by descending lower than 150 feet. Do your low altitude work at a field where the results of a cold engine or poor judgment will be mitigated by a nice, long runway. Employ an instructor to smooth out the rough spots, to help you avoid concentrating on one thing at a time at the expense of safety, and to point out your mistakes.

Our confidence in the method is exceeded only by our sincere hope that you may never *have* to use it—as we did so often in "the good old days". END

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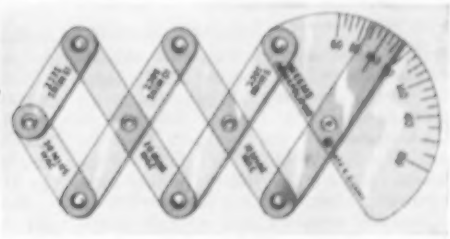

The new Casey-Myers speed-time Computer is designed for pilotage by light plane pilots under contact flight conditions. Based on "lazy-tong" principle, this computer is the simplest to use that we've ever seen. A series of arms in lattice formation (see illus.) are connected by central eyelet pivots permitting computer to be expanded or contracted in a straight line. Distance between adjacent eyelets represents 10 minutes on WAC charts and 5 minutes on sectional charts indicating distance flown at the ground speed indicated on speed scale. This Computer makes it easy to establish ground speed and ETA while flying. Also enables you to quickly, easily find ETA at any check point for estimated ground speed before takeoff. Designed by The Honorable Richard G. Casey, Minister for External Affairs, Commonwealth of Australia. Only $4.00. See your aviation dealer or order direct from us. Address Dept. 15.

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AIRCRAFT OWNERS AND PILOTS ASSOCIATION

AOPA NEWS

Aircraft Owners and Pilots Association is a service organization for the private pilot or aircraft owner. AOPA's full time staff is devoted to helping the individual pilot. Its aim is "To make flying more useful, less expensive, safer and more fun."

Headquarters address is Box 5960, Washington 14, D.C. Members also receive a special AOPA edition of FLYING, newsletters and confidential aviation data. Opinions expressed in this column are not necessarily those of FLYING Magazine.

ANNIVERSARY

AOPA passed its 16th birthday in May, with a total of 45,000 active members and records of 117,750 persons who are or have been active members during the years since AOPA was born in Philadelphia, Pa., in 1939.

To mark the new age and membership milestones, AOPA president, Joseph B. Hartranft, Jr., issued AOPA's annual report for 1954. It contained these highlights.

- AOPA added 9,358 new members to its roster during 1954, while the member-renewal rate continued at slightly more than 80 percent. Hartranft considered this particularly significant, because many AOPA members have been active for ten or more years, and the normal drop-off rate due to death and aviation inactivity might be expected to exceed 20 percent.

- AOPA members now own and operate over 28,000 airplanes—more than 50 percent of all the active registered aircraft in the U. S.

- AOPA's new aircraft listing service (made possible by the 1954 addition of a complete IBM Department) provided 12-hour service of detailed breakdowns (make, year, model, owner and nine other information categories) on all of the country's registered airplanes to numerous industry groups, including Beech Aircraft Corp. and Lloyds of London, who used the service.

- The same service was used experimentally to test the need for AOPA Safety Service—recently inaugurated as a permanent AOPA feature—which puts CAA mandatory and advisory bulletins into the hands of every plane owner whose plane they affect, almost immediately after they are issued.

Personal accident and aircraft insurance—available to AOPA members at reduced rates through American Mercury Insurance Co.—showed a purchase increase of 35 percent, and Americo made payments amounting to $58,600 to the beneficiaries of 71 AOPA members killed in flying accidents who were covered by the automatic AOPA-membership flying only insurance.

- The life insurance plan administered by AOPA and underwritten by the Minnesota Mutual Life Insurance Co., showed a 30 percent increase of insurance in force, and the maximum amount of insurance available to AOPA members under the plan was increased from $5,000 to $20,000 per member during the year, while 34 claims were paid to insured members' beneficiaries.

Among the plans for 1955 announced by Hartranft's report were:

1. An expanded membership service for pilots desiring cross-country flight routing and travel assistance.
2. Safety Service (already a reality) to notify all aircraft owners of CAA mandatory and advisory reports involving their particular airplane.
3. A new Air-Charge credit plan (also now existing) for the purchase of aviation fuel and services.
4. An automatic system for notifying pilots of their medical certificate's expiration date.
5. A new plan for personal accident "trip insurance" similar to the airline vending machine type of coverage.
6. An aircraft financing plan.
7. Extension of IBM facilities for pilot listings.
8. Availability of charge facilities for hotels, restaurants, and other traveling needs.

FLIGHT-CRUISE

Within a few weeks, over 600 AOPA'ers, their guests, and maybe other interested parties will be basking in sunbright luxury and comfort aboard the 600-foot-long, seven-deck-high, three-stacked *Queen of Bermuda*. On September 3, the voyagers will be heading for a six-day, Labor Day-week cruise to Bermuda's "Island Paradise" as participants in AOPA's Eighth Annual Round-up.

The combined flight-cruise was planned for this year to give AOPA members an annual round-up vacation trip that can't be postponed or spoiled by bad weather. Early member acceptance of the plans indicated that a ship load of AOPA members would be on hand by sailing time.

Reservations are on a first-come-first-served basis with first priority for AOPA members, second priority for guests of AOPA members.

Travelers having paid-in-advance reservations will arrive in New York City by personal plane, airplanes, automobiles, etc. If they arrive by private planes, their tie-down and transportation to pier needs will be filled by AOPA. Embarkation time is 1 p.m., EDT, September 3, although sailing time is not until two hours later. The rest of the itinerary includes:

Sunday, September 4. At sea, cruising the gulf stream. Divine services in the morning. AOPA Aviation forum, deck games, swimming, dining and dancing in the afternoon and evening.

Monday, September 5. Arrive Bermuda at 9 a.m. Use the ship as hotel with meals included. Optional shore excursion program.

Tuesday, September 6. At Bermuda. Time ashore—golf, swimming, sightseeing,—or freedom for independent activity.

Wednesday, September 7. At Bermuda. Free for independent activity. Sail at 3 p.m. for the return trip. Midnight deck buffet supper.

Thursday, September 8. At sea, cruising the gulf stream. AOPA aviation forum in the morning and afternoon. Deck sports in the afternoon. AOPA annual banquet in the evening. Dancing and entertainment.

Friday, September 9. Arrive New York at 9 a.m. Depart for home by chosen transportation.

Detailed information regarding types of accommodations and costs is available from the cruise manager, Lincoln T. Miller, United States Travel Agency, Inc., 807 15th Street, N. W., Washington 5, D. C.

LIABILITY RELEASES

There are two ways other than by insurance that a pilot can be protected from possible suit in case he has an accident which injures a passenger who has been invited for a ride.

One way is to have all passengers sign liability release forms before flights begin. While no one can guarantee that the release (available to AOPA members in handy pads) will fully protect a pilot, it is AOPA's legal counsel's opinion that the form is valid, although it has never been tested by any court.

The other protection is through a guest liability law on the books of the state in which a pilot flies. Where this kind of law for aviation exists, pilots are safe from liability for guests unless an accident is caused by gross negligence or willful and wanton disregard for the passenger's safety.

AOPA's Washington counsel has pointed out that more than half of the states in the U. S. have such statutes to protect automobile owners and drivers, but that few states offer the same protection to airplane owners and pilots.

In its official publication, the AOPA PILOT, AOPA has recently urged its members to campaign actively in their respective states to obtain guest liability statute passage by this year's sessions of their legislatures, if such statutes have not already been enacted. Meanwhile, AOPA urged all of its 40,000 members to make good use of the AOPA liability release forms to help avoid possible damage suits.

What's Going on in General Aviation

(Continued from page 21)

need is equipment originally designed for its exacting purposes, and progress along that line is indicated.

Instructional flying is the weakest link in the general aviation range of activities and, we might add, in the entire scheme of national civil and military air power. Hours of instruction have gradually declined over postwar years until it must be concluded that rock bottom is currently hit at a scant million hours estimated for 1955. (Fig. 2.)

We expect the volume of instructional flying to rebound as the impact of the proven utility of the general aircraft becomes more evident to young men contemplating careers in industry, business and the professions. Not many years ago, application blanks for employment frequently contained the query, "Can you drive an automobile?" That same query concerning ability to fly an airplane is now creeping into consideration for employment. We know of several companies, large and small, whose sales force is almost wholly composed of pilots; and we know other instances where young engineers, lawyers and accountants clinched their chances for executive positions because, in addition to other considerations, they could pilot aircraft.

The contemplated flight training program for the Reserve Officers Training Corps, if established at several hundred civilian universities and colleges, will augment instructional flying. Friends in Congress assure us this proposal has no important enemies. Even this, however, will not place instructional flying in proper focus and some type of youth program, probably integrated with public school education, must eventually be evolved. The economics of a national program are fairly insignificant if properly distributed; and thoroughness of training along with adequacy of supervision eliminates the hazard element.

The purely training type of aircraft is, of course, the most obsolescent in the general fleet. Immediate postwar (1946) production of 1-2 place models exceeded 30,000 aircraft. Most of these planes are now approaching ten years of age. They still approximate more than one-fourth of the total general fleet, but their current rate of attrition is very high. If instructional flying does bounce back, a considerable market for light modern trainers is indicated.

Prophesied collapse of all general flying following actual collapse of the great volume of instructional flying in 1948-49, was never justified. Unsensationally but surely, general aviation was undergoing the test of utility—a test necessary to its very existence if personal use of the airplane was to be a profitable public tool.

During the war a wide range of professional and business men were exposed to the airplane in the military services. A sprinkling were already top executives but the majority were still on the way up. Many of these saw that the use of an aircraft might literally and figuratively have something to do with getting there. Hesitantly at first and quietly, lest stockholders, chief executives and union leaders make vociferous cause against such a "luxury" item in company affairs, the erstwhile Air Force or Navy veteran slipped his foot in the door by personal purchase of a war surplus or new light aircraft. Unobtrusively he started to use the plane on company business, sometimes charging "car" mileage and sometimes eating the bill himself. Within a few months a great many of these young executives, salesmen, engineers, ranchers, lawyers had made out an economic case for company ownership of aircraft as business tools. They could prove high competitive advantage, relatively good dependability and valuable prestige. Many of them could prove actual transportation savings over any other mode of effective company travel. So look what happened. (Fig. 2.)

We estimate that 1955 may prove to be one of the most significant years in a half century of general aviation. In this year the number of general aircraft engaged primarily in business flying will approach the number of aircraft engaged primarily in pleasure flying.

Our calculations indicate that in 1955 the number of aircraft primarily used in business will be around 22,000 and the number primarily used for pleasure will be around 24,000. At the same time it becomes very apparent that the pleasure market remains a continuously stable factor in general aviation. What margins of error may be involved in these calcu-

(Continued on page 62)

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By their participation as AOPA AIR-CHARGE Facilities, the Operators are encouraging the increased use of light aircraft as an efficient and modern method of transportation. At the same time they will profit by the increased business that will be brought to them by AOPA Pilots—the world's most active group of private flyers.

Following is a partial and typical listing of the Fixed Base Operators who are now Charter Members of AOPA AIR-CHARGE:

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Virginia Airmotive
Woodrum Field
Roanoke, Va.

Page Aviation Service, Inc.
Oklahoma City, Okla.

Owensboro Aviation
Owensboro, Ky.

Van's Air Service, Inc.
St. Cloud, Minn.

Holland Flying Service
Valdosta Municipal Airport
Lowndes
Valdosta, Ga.

Wings, Inc.
Wings Field
Philadelphia, Pa.

Tradewind Airport Corp.
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Amarillo, Texas

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Mattituck Airbase Corp.
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Aircraft Sales & Service
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Atlantic Aircraft Distributors, Inc.
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Anderson Aviation Company, Inc.
Phoenix, Arizona

Hoequist Airport
Orlando, Florida

Aeronautical Sales & Service
Flint, Michigan

Mohawk Valley Aviation, Co., Inc.
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Other operators desiring to participate in this great forward step in civilian aviation are invited to contact AIRCRAFT OWNERS AND PILOTS ASSOCIATION, P. O. Box 5960, Washington 14, D. C.

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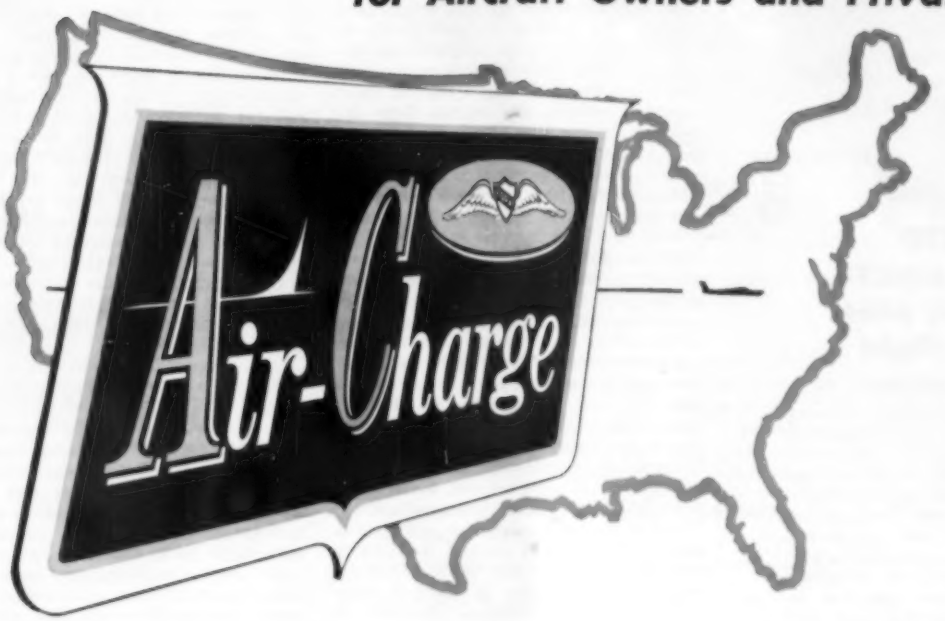

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(Continued from page 59)

lations are problematic, but the basic fact remains—*profit has come abreast of fun as an incentive to aircraft ownership.*

How exactly to rate the number of aircraft used primarily in instruction is a problem. By putting various pieces of data together, we judge instructional aircraft earn their salt in numbers somewhere between 5,000 and 5,400. At most airports a student can receive flight instruction of one sort or another, but to spot aircraft which are reserved fundamentally for that purpose is difficult.

Many with whom we have talked appear surprised that the age of the average private pilot is as high as 30 years. Candidly, we think the figure is on the low side. Much instruction is given as a part of the purchase program of a new aircraft, and which aircraft today is being purchased by youngsters? Even the rosters of the average flying clubs show age levels on the mature side, as contrasted with the 'teen age group. It takes no great study of the graph below to realize that in the meager volume of instruction being given, after elimination of instruction to new aircraft owners, there is no room for instruction to youngsters.

One of the most encouraging of present day phenomenon in general aviation is that, for the first time in a stretch of years, the production of aircraft units will exceed the attrition. Growth of plane utility, of course, has accounted for this fact. Many of us recall when a "station wagon" was a rarity in the automotive world. Just so was the four and five place airplane. A glance at the figures below will show what has happened in aircraft production—a complete reversal of concept since 1946.

4 and 5-PLACE AIRCRAFT PRODUCTION AS PER CENT OF TOTAL PERSONAL PLANE PRODUCTION

1946	7%	1950	68%
1947	38%	1951	72%
1948	45%	1952	80%
1949	69%	1953-54	75-78%

But the mere number of utilitarian aircraft produced now as contrasted with yesteryear does not tell the whole story. Owners of modern aircraft fly them far in excess of what aircraft were normally flown a few years ago. This is especially true in the case of company-owned aircraft—approximately 13,000 of them in 1955, or more than half of all the planes used primarily in business. Incidentally, engine dependability has reached a superb level. For example, out of the several thousand forced landings and accidents in 1953, only a small fraction was due to engine trouble. The progressive maintenance and generally fine handling of business aircraft by company pilots has contributed mightily to the growth of business flying. Even the best of planes could not have made business flying stick without this excellent pilot character.

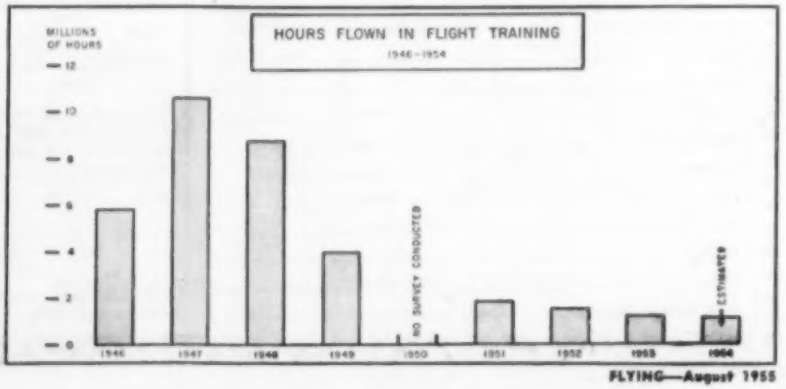
In the commercial field, the aerial applicator uses a fleet of some 4,000 planes for dusting and spraying. His aircraft will fly some 800,000 hours in 1955 and average per plane a number of hours well above the annual hours of the general aircraft fleet. The single engine biplane is the foundation of the applicator fleet, most of the craft being war surplus from Training Command. Such craft grow scarcer and scarcer.

It is difficult to estimate exactly what number of aircraft are used primarily in patrol and survey work. Our best evaluation is that about 1,500 planes are employed primarily in this function and another 1,500 participate to some extent. As would be expected, patrol and survey work calls for long hours aloft, and the average annual flying per patrol plane appears to be in excess of 300 hours.

Both in the applicator and patrol activities, the helicopter continues to show great promise. Likewise, 1955 will show a statistically interesting growth of scheduled helicopter passenger and mail business.

In conclusion, we must express a sincere optimism on the entire general aviation potential. For the first time in aviation history, the major appeal of the general plane is based on its usefulness. Every day brings news of some additional service to which the small plane has been adapted. There is no apparent ceiling to such usefulness, once the American people learn to look to the plane as a possible tool of their normal business and professional problems. To get them to look without a fear complex, and to think of the small plane from a profit standpoint, has been the problem—now well on its way to solution.

To the CAA for its helpful attitude and copious information; to many pilots and operators in the field for their valuable observations; and to all who read this report with an understanding that much available data of importance could not be included—a hearty thanks. END



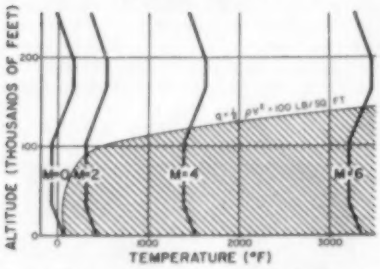
The Heat's On

(Continued from page 27)

gressively hotter—still at Mach 2—until it was slightly hotter than 500 deg. F. at 170,000 feet and hold this temperature at all altitudes to 200,000 feet. Then—still at Mach 2—it would begin to get progressively cooler.

At Mach 4, on Adam's graph, a plane would heat up to 1,500 degrees at sea level, and cool down 50 degrees at 35,000

ADAM'S GRAPH



feet. The temperature would hold steady to 100,000 feet . . . rise again to 170,000 feet . . . hold steady to 200,000 feet . . . and start to drop again at 200,000 feet. In other words, the *shape* of the curve would be the same for a Mach 4 speed as for a Mach 2 speed—just hotter. The Mach 6 temperature is 3,400 degrees F. at sea level and thereafter follows the same pattern.

These graphs are amazing when you think about them. The layman would think that an airplane would be consistently cooler flying in thin air than in dense air—no matter how long it stayed up. That is not true. The plane is cooler if it stays up a short time—but not if it stays at certain altitudes long enough to become thoroughly heat soaked.

Here's a practical example.

At Mach 4, an airplane flying at 120,000 feet loads 2,000 British Thermal Units (that's heat measurement) onto every square foot of the airplane, every hour. Take that same Mach 4 airplane down to sea level, however, and it would sop up 177,000 BTU's per hour. Down low, the airplane would pick up almost 90 times as much heat in the same time. "Time" then, is the keyword. No matter where you fly, high or low, you reach the same equilibrium temperature for a given speed if you keep at it long enough.

Now that you have what is admittedly a very sketchy picture of the character of the Heat Barrier, let's see what the ASME people are advising that we do about it.

Take the fuselage first. In the past few years there has been a spate of articles about the "wonder metal," Titanium. It has been represented enthusiastically as being as strong as steel, as light as aluminum, and practically proof against any degree of heat. Unfortunately, this is not quite the truth.

Titanium *is* a very superior metal for use in highspeed airplanes. It seems to have a bright future and is currently being used in a number of the latest military craft. But it is not the magic answer to hotspeed flight. Titanium begins to fold

(Continued on page 64)

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RATTLESNAKE ISLAND COMMUTERS

AIRPLANES get all kinds of hauling jobs and now they're even used as school busses—at least, they are for three Ohio youngsters. Henry, Lawrence and James Lasch, aged 9, 12 and 15, commute daily by plane between their home on lonely Rattlesnake Island in Lake Erie and their school, a mile and a half away at historic Put-in-Bay.

The boys are the steadiest customers of Sky Tours, Inc., busy little scheduled airline that connects the Erie islands with Port Clinton and Sandusky on Ohio's mainland. It flies 29-year-old Ford Tri-motors, possibly the last Fords left in scheduled air service anywhere.

Rattlesnake Island is a bare 50-acre reef on which only two families live. The air field, with two 1,500-foot strips, occupies about half its acreage. Owned by the Roman Catholic Church, Diocese of Toledo, the island is used in summer for a boys' camp.

When the Lasch brothers' father became the island caretaker a few years ago and moved his family there, the boys gave school authorities a problem—they would either have to establish a school on the island, an expensive proposition, or transport the boys to and from school. Since Lake Erie gets mighty rough and dangerous in winter, the airline was the obvious solution. Each morning and evening, winter and summer, one of the Fords makes a daily round of the islands, picking up and dropping off passengers, mail, papers, groceries, etc. Re-scheduling their flights to fit school hours, the line now picks up the boys at 8 a.m. and delivers them back at 4 p.m.

Although the novelty is wearing off, the lads still get a kick out of the daily flight.

GEORGE R. REISS

(Continued from page 63)

up at 800 degrees F. which means it is a better material than some others—but not a cure-all.

How does heat get into the inside of a high Mach airplane? N. J. Hoff, Head of Aeronautical Engineering and Applied Mechanics at Brooklyn Polytechnic Institute defines it:

"In consequence of their random motion, molecules of hot air impinge upon the surface of the metal wing and excite the vibrations of the surface layer of atoms. These atoms in turn exert forces upon atoms further away from the surface and transmit to them part of their vibrational energy. Thus atoms deep in the metal are excited and begin to vibrate more vigorously; that is, their temperature is raised. Heat is thereby transferred through the metal structure."

Fortunately, heat travels very slowly through a metal rod. Hoff says: "It has been shown that if one end of a long steel bar is suddenly heated and maintained at a temperature of 600 deg. F. above the initial uniform temperature of the bar, the temperature of a section 10 inches from the heated end is raised only 50 degrees F. in 15 minutes."

This phenomenon is a double-edged sword. It gives the "heat-ducking" school of engineers (who want to fly high, for a short time, and then come down) a break,

because an airplane is relatively slow to heat-soak throughout.

But there is a deadly joker in the deck. Because the end of the bar is very hot—while only a few inches away, the metal is relatively cool—a terrific "temperature gradient" is set up. This means powerful internal stresses, which tend to fracture the metal internally. It also means that the surface of the metal will tend to become relatively plastic, and will deform slightly, or "creep."

This deformation is permanent. It gets progressively worse every time the airplane flies. A plane which flies at extremely high speeds where vast amounts of heat are generated, could not be used more than a few hours with safety. After that, it would have to be rebuilt, because its outer surfaces would have deformed beyond the factor of safety.

This term "factor of safety" with which engineers live their lives, suddenly loses its simplicity in hotspeed flight, and becomes almost impossible to handle. At the present time, all commercial and military airplanes are designed using a factor of safety of 1.5, which is defined as the ratio of maximum load the structure can carry to the actual applied load. Many engineers feel, however, that applying this factor indiscriminately to all parts is not practical. Two prominent engineers, Steinbacher and Young, write about safety factor: "The present margin of safety is based on load-carrying ability. In a high-temperature aircraft, however, four important variables are involved: creep or creep rates, time, temperature, and stresses—any of which can be critical . . .

"The conventional 1.5 safety factor applied to the stress is almost ridiculous under these conditions since it is considerably more than enough to insure 'indefinite' creep life. Applying a safety factor to the temperature is equally ridiculous because even small factors can reduce the stress level as much as, or more than, the conventional 1.5 safety factor used at room temperatures."

Steinbacher and Young, sum it all up by saying that safety factor is so basic to the overall problems of high-Mach flight that it will take a coordinated effort between industry, the military and the CAA to come up with practical, workable solutions. In fact, if this country expects to make real progress in a hurry on hotspeed flight, it will be necessary for everybody involved, from the makers of quick fasteners to the pilots who test the planes, to sit down in a huddle and plan the airplane from scratch. Otherwise the plane is like a story with a lot of exciting action but no plot. A haphazardly organized high-Mach plane is worse. Any one of a thousand tiny details *can ground it.* Several fabulous British fighters are reported to be in such trouble design-wise, nor have American types escaped tragic results. These planes were simple Mach 1.5 airplanes—or slower. The fact is, when we start operating past Mach 1, even without great heat, the airflow problems begin to get troublesome. It will behoove American aviation in general to gather around and plan the hot-speed airplanes from the ground up, unless we

(Continued on page 66)

Curious?

MOODBEAMS #7

Being curious about a fizzing firecracker is comparable, say, to NOT being curious about the condition of metal fuel tanks in an airplane. On the one hand, Hope Frarer (24, 5' 5", 118 lbs., blue eyes, blonde hair) may get the lipstick blasted right off that pretty, perky face of hers.

On the other hand, a pilot with a leaky gas tank may — well-llllll, you know!

If you aren't sure about your tanks, we urge you to get curious NOW, and let us remove, clean, inspect, and repair them; slush them with a protective compound, and reinstall them in apple-pie order. In any event, this should be done every thousand hours or two years.

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Recreational facilities include a swimming pool, fishing in Ware River, and a children's playground.

(Continued from page 65)

wish to waste years of time and billions of dollars.

The three basic problems (without going into electronics, armament, hydraulics, and the hundreds of vitally necessary systems a modern airplane carries) are: motive power, airframe, and pilot comfort. At present we are muddling along with turbo-jet power in all our supersonic fighters, but the best engine we've currently got is reported to be only on a par with the best engines of other nations. *Not* outstandingly better, as we would expect from our past performance in designing engines. The Russians are using rocket-powered fighters. Rockets have the tremendous advantage of minute weight per pound of thrust delivered. With a pint-sized rocket ship and a midget rocket meter, it could be possible for an enemy to overtake and shoot down a big, appallingly-expensive turbo-jet escort fighter. How the Russians land their rocket airplanes is something they aren't talking about—but anything capable of 1,000 miles an hour must be hot to handle deadstick.

If we hope to fly above 100,000 feet at very high speeds, we will have to go to rockets for auxiliary power, at least, and design doors to close over turbo-jet inlets to keep turbine blades from being dam-

aged by overheating. Heating, as a matter of fact, is the limiting consideration in a turbo-jet. The air heats up very critically, even when it comes into the scoop subsonic. But when it comes in at Mach 2, the heat problems inside the engine become critical.

Design of airframe gets critical as you climb the speed scale. Tests made by the National Advisory Committee for Aeronautics indicate that a sleek, smooth, laminar airflow is very cool as compared to a burbling airflow. Flush rivets are fine in sub-Mach airplanes. But in the hyper-Mach ships it is necessary to go further—remove every lump, bump or hummock on the outside of the plane. If you don't you may find them melting off, like chocolate icing off a cake.

Cooling the pilot, of course, is absolutely vital. A pilot can't make good landings if he's par-boiled. Systems have already been developed which will remove up to 500 degrees of heat from incoming air—and this is *really* cooling.

The University of California, at Los Angeles, has been busying itself in a pilot project, where they load a man into a trainer device and trundle him into a sweatbox. Marvin Miles, a west coast aviation writer, volunteered as a guinea pig in this experiment, to get atmosphere for his writing. Marvin proved to be a pretty rugged boy at that. He lasted up to 247 degrees F.—35 degrees hotter than boiling water—before his heart began to hammer at 176 beats per minute, and he couldn't tell his own name. Just before the heat conked him for better or worse, the professors thoughtfully withdrew Marvin from the box. He was ready for basting.

Big G loads, of course, will be highly dangerous in a 3,000 mph airplane. If a pilot got rattled and yanked back on the stick when racking up 3,000 on the dial, he might go right through the bottom of the ship, or squish down into a little pile of hamburg. Or suppose he ran into one of those vicious "clear air bumps" which have been jolting the bridgework of the stratojet boys in the tropopause!

Noise levels in hypersonic flight are already giving aviation the terrors. Noise goes up the same graphline with power. We ain't heard nothin' yet. Wait until a Mach 5 rocket ship takes off over Levittown.

Runway lengths are another troublesome item. Bill Bridgeman ran 15,000 feet on the ground to get the experimental *Stiletto* off the ground. How many 15,000-foot stretches are suitable for airplanes, within the realm of practical real-estate prices? I have the answer for you—none.

However, high-Mach airplanes are definitely coming. It is not a question of "*if*" for we must build them to combat enemy high-Mach planes, if for no other reason. It is only a question of *when*.

High-Mach flight will be with us in our time. Around the world in a few hours will be possible. You can slip over to New Delhi for a tiger hunt, or shop at "Joberg" for a diamond. The vista is exciting. It can also be very profitable for people with vision, energy and basic faith in aviation. END

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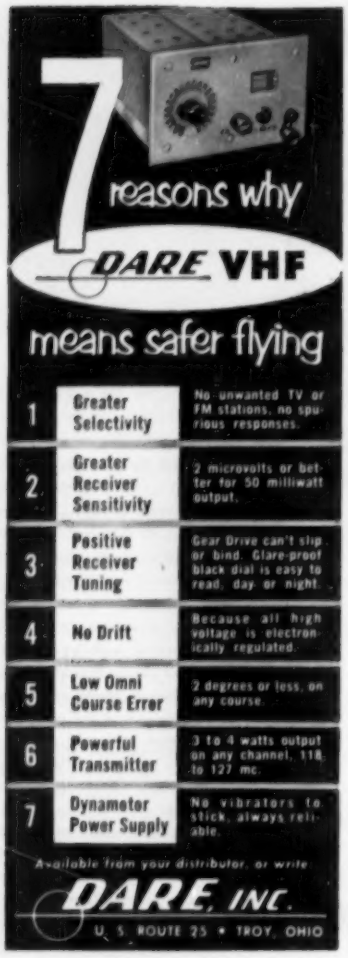
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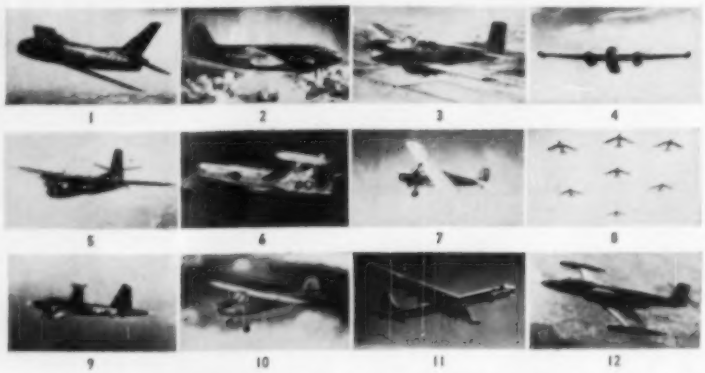

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Great-Grandma at the Throttle

(Continued from page 47)

Command airport at Palm Springs was rapidly growing up with weeds and wasn't doing the town much good. I leased the field and brought Bert and Mac Haskell in to operate it. We now have an airport that is in good shape with what we think is the kind of service you'd expect from a resort like Palm Springs—and I have a place to keep my *Ercoupe*.

About this time, the "Ninety Nines" scheduled their annual meeting in Asheville, N. C., and I decided to attend. I had the 85 Continental on my *Ercoupe* majored, put in shoulder harnesses and a VHF transmitter with low frequency receiver, bought a set of WAC charts and had the compass checked. Up to the time I left on this trip, I'd flown 187 hours—with no radio in the plane.

To make the trip completely from ocean-to-ocean, I started from Del Mar on the Pacific Coast where I visited my great-grandson, Gary Lee King, and made my first stop at Phoenix, Ariz. The next day I planned to make El Paso, but the weather got rough and I don't like being "spanked" in turbulent air, so I spent the night at Deming, N. M. Then on to Ashville via Abilene, Shreveport, Jackson and Knoxville.

This was all new country to me from the air. Yet the only unpleasant experience of the whole 64 hours was some dirty weather between Selma, N. C. and Richmond Va. I filed a flight plan and checked the weather reports which showed light scud at 1,500 feet. When it got down to 800 feet and was solid, I hooked on to a railroad and followed it until I found the airport at Emporia, Va. I landed in a rainstorm, taxied as close to the highway as possible, tied the airplane to the fence and found a telephone for a cab into town. The Lyons Club in Emporia invited me for dinner that evening and I wound up as their guest speaker.

In all, I was on seven different television shows during this trip and did my best to boost private aviation for those who still do not fly. I delivered a letter in Harrisburg, Pa., from California's Governor Knight to Pennsylvania's Governor Fine, and got into bed at 2 a.m. after a TV show and party.

On my way home I stopped in Salem, Ill., to visit Mr. Richard Yohe who operates a laundry service there. He was 46 before he could afford to fly—and felt then that he was too old. After he read a newspaper story about me and my license at 65, he started taking lessons. Now he has a Cessna 170 and flies wherever he wants to go. I went up for a ride with him and he's a very fine pilot.

I visited my old home in Missouri and took a long list of relatives up in the *Ercoupe*, some of them for their first flights, from the Rolla Airport.

The trip back west was beautiful, though the weather left a little something to be desired. Thunderheads kept building up every afternoon, so I restricted my flying to mornings. I spent three days in Winslow, Ariz., "sweating out the weather". When it looked good, I took off and followed the highway up over Flagstaff and then down Oak Creek Canyon to Jerome and on to Phoenix for a visit with Fred Smith, my original instructor. Fred is now a consulting engineer with AiResearch.

The most beautiful part of the trip, of course, was coming up over the Little San Bernardino Mountains and seeing Palm Springs on the horizon, snuggled at the base of Mt. San Jacinto.

Flying in the desert as much as I have, a little mild turbulence doesn't bother me. I enjoy riding up in thermals, just like the glider pilots, because it's getting something for free. With the hot weather so common in the desert, it's a lot easier on the engine to pick up altitude in a thermal and then head out "on course" than to force your way upward with brute horsepower. But when the thunderheads begin to form and it gets real rough, I head for the barn.

Flying alone is fun but I hope to take my sister, Mrs. Ellis Parker, on my next long cross-country trip. She's now 63 and was my first passenger. We flew up around 11,485-foot Mt. San Gorgonio to

(Continued on page 69)

(Continued from page 68)

Apple Valley for breakfast one morning just after I got my license.

All my solo flying to date has been in my three-controlled *Ercoupe*—except for one hour for which the Haskell Brothers really bawled me out. I was at the Palm Springs Airport one morning checking over my plane when a friend, Frank Chalfont, came out to take a trip in his single-seat Mooney. Jokingly, he aked me if I'd like to fly it, figuring that I'd probably say no.

When I accepted, he showed me around the cockpit, pointed out how the landing gear came up and sent me on my way.

I had the thrill of my life. I flew the little ship for an hour in the Palm Springs area and enjoyed every minute of it. The pint-sized Mooney is so completely responsive on the controls and acts like a feisty little Terrier. Naturally, I came in for a landing at a fast 80 mph in this strange airplane, but the 7,000-foot runways at Palm Springs were more than adequate.

When I taxied up in the Mooney, the Haskell Brothers were out on the flight line chewing their finger nails. They gave me a long and earnest lecture about flying other people's hotter airplanes and told me to take it easy. But it was a lot of fun and I got the thrill out of flying the Mooney that I'd expected when I first soloed—and didn't get.

I've had only one trip—to Vancouver, B. C.—in an airliner. The only other trip I ever made as a flying passenger was with Mr. and Mrs. Winn Line from Palm Springs to New York in a Bellanca seven years ago. When I expressed some interest in flying at that time, they put the idea over in a very nice way that I was just a little too old.

Now that I have my *Ercoupe*, I don't have to fly commercial or go along for the ride in the back seat. I'm convinced, and believe that I can prove it to the skeptics, that anyone can learn to fly. Regardless of age, I'm certain that anyone can go cross-country safely if he won't stretch his gas, fly VFR and know when to make a 180 degree turn from weather.

That's what I do, and I wouldn't have missed it for anything. END

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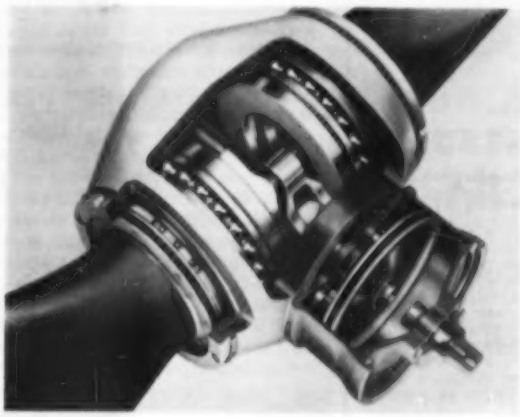

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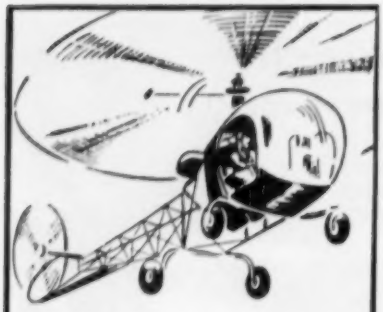

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Pipeline Patrol

(Continued from page 41)

Kansas, north to Detroit, through the icy Poconos, up through the foggy Catskills, down east to Boston and to New York.

I flew the long patrol with him, piecemeal. We started from Monroe, La., Mac answering my weather-query with a casual, "All kinds, brother, all kinds." I didn't pay too much attention with the early morning air smooth as silk. We hopped out over lush green bayous following a line I couldn't see. Over the farm lands it was more noticeable. The crops grow greener above a pipeline. With satisfaction, Mac pointed out a large brownish spot spreading from a rival line. "Slow leak," he explained. "Ground patrol goes over it every week or two, but hasn't spotted it yet." That seemed incredible but illustrated the prime advantage of aerial patrol. A leak in the line seeps through the ground, discoloring it in a large circle. However, the color may graduate so gently that it cannot be noticed by a man on foot. From the air it is clear as a chalk mark. Such circles are usually signs of leaks causing no disruption of flow or breakage of ground surface, but they can cost a pipeline, charging on a metered-delivery basis, a lot of money. "In the spring, the ground patrols have an easy time," Mac noted. "They can see gas bubbling or oil slick on a tabled water surface." He didn't mention that ground patrols would be sloshing kneedeep in water and mud!

The bayou country was flat and began to dot with summer storms and haze. We didn't fly around the weather. We stuck on the green lines and flew under. The air began to roughen up. The expression is mild. Some of those jolts felt like we'd hit the ground and bounced! Mac pointed to a slender finger of dark green meandering in toward the bright green line we followed. "Wet channel," he announced. "Let it go a month, or come a bad storm, and that channel can eat in under the pipe and break it." He radioed the location back to the maintenance foreman for attention.

We climbed up into the hills. Cuts for power, telephone, other pipelines, coaxial cables, fire breaks, highways, new rights of way, crisscrossed like a puzzle. Often, the horizon was barely beyond the wingtips. We would turn sharply and scoot through a canyon. But there might be another that looked just like it six miles ahead. It took orientation, all right!

We climbed hills and went down slopes like a roller coaster. A patrol pilot needs a map etched inside his head. Over a ridge the pipeline headed smack into a thunderstorm. It looked liked pure soup to me, but Mac insisted the line was clear to see. I mentioned that it would be easy to lose the line. He shrugged, "You can always turn around." I asked how often he had to do that. "I don't," he grunted, as if the point were fairly obvious.

We bedded down a good hour before daylight waned. Over open, flat country, we'd have stayed up that extra time, but here in the hills evening shadows could dim out signs of trouble. I was deadbeat with the simple concentration of low fly-

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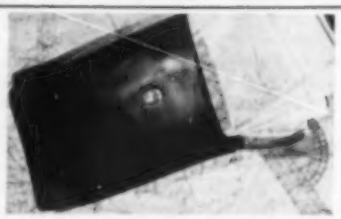

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ing. Mac had trebled that chore with one eye on his flying, one eye on the pipeline below, and a third one inside his head on that mysterious orientation map. Yet he was still relaxed.

Next morning we headed northward over mountains. Turbulence over hot plains keeps pilots toughened up in summer for the roughness of winter in the mountains. Each season and terrain offers its special problems. Rains gulley under pipelines and form ditches alongside them. Frost leaving the ground will set rock slides smashing at them.

Mac has a permanent feud with construction engineers whom he swears will replot whole jobs just to place some high pole unexpectedly alongside a pipeline right of way. Even a 60-foot pole or tower can reach into an aerial patrol's line of flight if set on the side of a tight, narrow gulch or over the crown of a hill. His riskiest patrol right now is through the Catskills, where a wildcat natural gas boom is in process, and crews are liable to rig drilling towers any old place to poke unexpectedly through fog. Few of Mac's lines ever have trouble because he is always looking to the sides of the right-of-way—to the creeks, overhangs, undercuts, walls that may overflow, fall, eat in or open gorges. Where pipelines drop beneath rivers is the worst trouble spot. Mac has a personal war with every river along his lines, but it varies with the seasons. In winter it's due to ice, in spring to thaw, in summer to water levels and, in fall, just general principles.

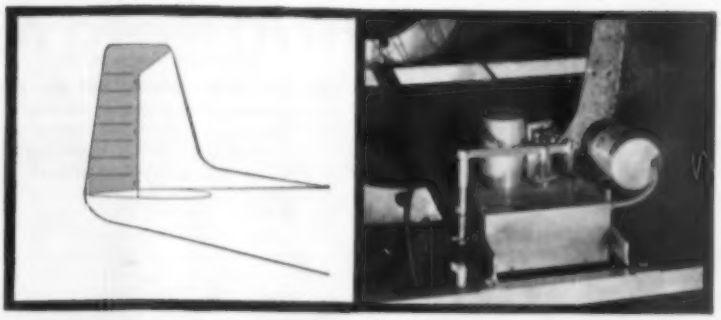
He was telling me about that when we headed straight at a dead-end wall. Mac pulled a sharp turn and set his nose down through a gulch without even breaking his talk. The air suddenly felt like we were being scrubbed on a giant's washboard. "Rain about three miles ahead," he noticed. "Always kicks up the air through here." We made another turn, and there was the rain, sluicing a valley. Mac scowled at a muddy creek where the water was trying to eat a new channel. He radioed the location to maintenance with a growl, but his mood was lightened by the fact that a ground patrol wouldn't have noticed the trouble-spot for weeks.

We flew into pea soup, heading for an airport. "Kind of murky," I noted nervously.

"Yeah," Mac agreed cheerfully. "Think of all those pilots up on top who are wishing they were underneath!" Not us, though. We just floated down through the rain and coasted in nice and easy. Mac disengaged himself from his tight-fitting Stinson and glanced at the low grey ceiling scudding right above us. "Safest flying in the world," he grunted. "If you just know how."

So I listened for 30 minutes while he briefed me on the history of 5 million miles with only one accident. But he didn't mention what you do unless you have 25,000 hours behind you. I mentioned that, but he just shrugged, "*My* boys know!" Then he frowned, "But there's still a lot of pipeline that isn't efficiently patrolled."

Of course there is. It isn't yet all patrolled by McMahan! END



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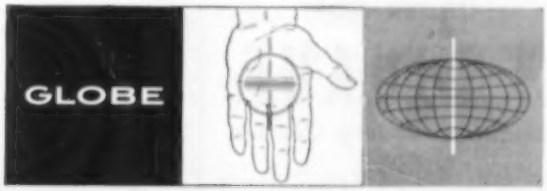

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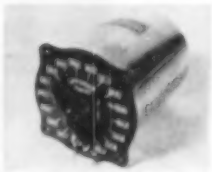

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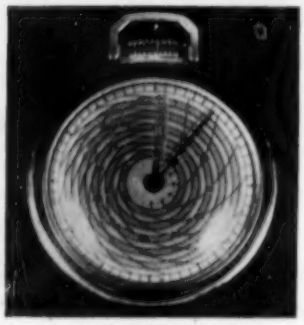

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Lufthansa

(Continued from page 38)

operation was repeated off the South American shore to provide two-way service. Nineteen hundred and twenty seven was the first year of this operation. The convenince of this direct service to South America repaired the weakening prestige of DLH. The French were quick to duplicate Lufthansa's route and their competition required immediate action. DLH had to give shorter services or be squeezed out. The answer to French competition was a masterpiece of precision airmanship. Two especially-equipped fast steamers were used as off-shore bases, one on either side of the Atlantic. The Dornier *Wal*, twin-engine flying boat, landed alongside, was hauled on board, refuelled and catapulted off to cross mid-ocean to the other floating base. Flying a regular weekly round trip, DLH flying boats and land planes relayed the air mail from Berlin to any point in South America in three days—a record unbroken for many years.

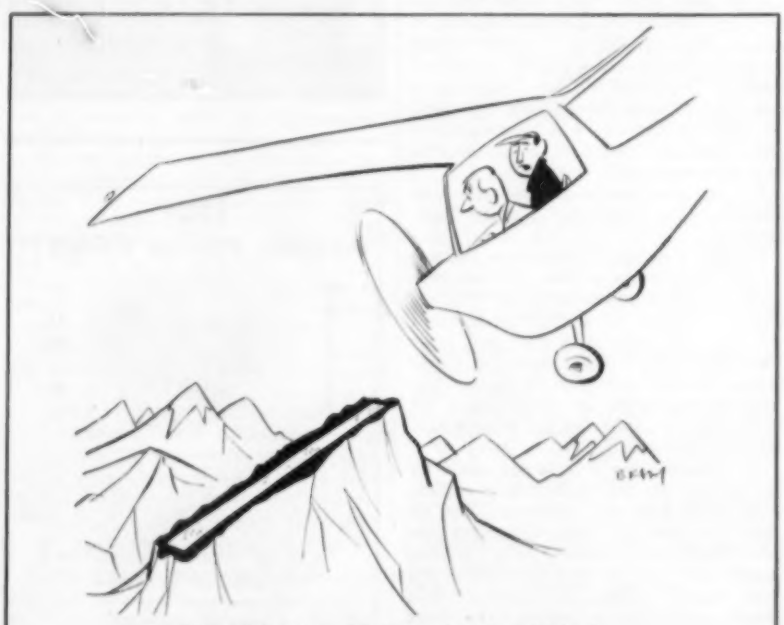
Encouraged by success in South America, Lufthansa then sponsored trial flights over the North Atlantic. Two catapult-equipped, fast steamers, *Bremen* and *Europa* provided the airmail link. While the eyes of the world were on Lindbergh, Chamberlin, Byrd and others, German flyers mapped out a systematic campaign. Among abortive attempts were those by Edzards and Ristics, two Junkers factory pilots; Ernst Udet, and another German ace, Koennecke.

When Koehl decided to try the North Atlantic east to west he avoided advance publicity. On April 11, 1928, he took off from Berlin and headed west, to land at Baldonnel, Ireland, nine and one-half hours later. Next morning he announced he was going to try the big hop. Thirty-six hours and 30 minutes after take-off, Koehl landed on Greenly, a small island off Newfoundland. News that the Atlantic was crossed the hard way spurred Lufthansa to further effort. Mid-air refuelling was tried on route through the Azores and Bermuda. Meanwhile, Dornier kept building experimental flying boats of increasing size until, in 1931, the 12-engined DO-X triumphantly flew over Manhattan.

In the same year, high level talks with the Chinese were successful and the Sino-German air service *Eurasia* began to operate on intra-China routes. Again, German equipment and crews migrated, this time to China. They built airports, overhaul shops and weather stations. From Shanghai, *Eurasia* serviced Nanking, Peiping, Lanchow and even reached 2,200 miles across the Gobi Desert to Urumtchi in Sinkiang.

In spite of such far-flung operations, Lufthansa had a fine safety record. For each million passenger/kilometers flown in 1930, USA airlines led in flying safety with only .70 fatalities. Lufthansa was a close second with .77.

The Versailles Treaty and even the later treaty of May, 1926 expressly forbade German pilot training at government expense or with government subsidy. But Germany's wartime veteran flyers had to be replaced somehow with new blood. The ever-expanding Lufthansa routes required a new generation of skilled pilots. Solution to the flight crew problem came from the enthusiasm of German youth. Organized by Dr. Oscar Ursinus, gliding and soaring provided an inexpensive yet excellent way to indoctrinate young flyers. Record upon record was established at the gliding center on Wasserkuppe as the youngsters learned to live in the environment of the air. Aspirants to Lufthansa flight crew



"I'm a little disappointed, though—I hoped lots of folks would drop in when I built my own strip."

careers entered a special school operated by DLH. The course lasted four years. The first six months were spent in sailing small craft and learning navigation on the water. The next 18 months were devoted to flying lightplanes, with ground schooling in engines and airframe construction, fuels and materials, aerodynamics, and more navigation. During the first half of the third year, the student learned seaplane operation with more technical training and advanced navigation. The balance of the four years he flew airliners and learned airline procedures from selling a ticket to taking a fix with a sextant. At graduation, he was handed his "patent" as a good and reliable pilot.

The proverbial reliability of Lufthansa largely depended upon its weather observation system and forecasting. As far back as 1924, Germany led the world in weather station coverage. Even in 1930, when the USA began her internal air route expansion, Germany kept abreast of the American weather service. Weather studies undertaken by German universities were greatly helped by the cooperation of soaring pilots and by flight crews of Lufthansa. The end result was high weather consciousness.

For crews so well trained in the basic science of meteorology and flying, changing over to faster, more complex planes presented no problem.

Developed from the F-13 trail blazer came a family of Junkers types, each designed with a specific job in mind. The early thirties applauded the Junkers 52, a tri-motor counterpart of the famous DC-3. In anticipation of traffic increase, Junkers turned out a giant G-38 with its four engines entirely buried in the thick wing. The wing of that airliner allowed standing room inside and provided passengers with a forward view in flight through the leading edge windows. But the pride of the Junker Werke was the Ju 86. In 1938 when this sleek, twin-engine, cruiser came off the assembly line, Herr S. Achtenberg, chief test pilot, took it on a trial hop and did not land until he reached Bathurst, South Africa—a span of 3,600 miles. Even farther reaching was the Ju 90, a four engine plane built with an eye for transatlantic non-stop service. Its contemporary, and the equivalent of the American DC-4, the Focke-Wulf *Condor* was groomed for the South American non-stop service from Berlin. As a warm-up stunt, one of the first *Condors* powered by four 880 hp engines took off from Berlin and, 24 hours and 56 minutes later, landed in New York. On the return trip, the *Condor* touched down at Templehof, 19 hours and 56 minutes out of New York.

Then came September, 1939 and the war. Lufthansa was "drafted" and banished from the world family of great air fleets. Many Lufthansa Captains fell on the battle field. Germany paid the price of aggression.

And now Lufthansa is aloft again, and this is another day and another world. A great history lies behind Lufthansa. What lies ahead—well, may it always be in service of free mankind and thus great in precept as well as concept. END

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Hangar Flying

(Continued from page 29)

Sure enough, there were occasional sparks. Apprehension began to grow. I wondered what procedure would be if something happened to force us to land. It would be almost impossible to get back into Gulfport with the ceiling so low The nearest alternate was Mobile.

A short time later, we leveled off at cruising altitude. The trip itself was merely a round-robin affair to Dothan, Ala., and back to Gulfport. After a short time, we broke out of the overcast into a perfectly clear night and, dead ahead, lay Mobile. As we left the clouds, my anxiety dwindled. We arrived over Dothan and I checked in with Airways Radio and prepared to turn around for the trip home.

The return trip was to be made at a higher altitude and, since Bill Harrington, my co-pilot, was half asleep, I decided to adjust the engines for the climb myself. I opened cowl flaps to trail and reached for the prop controls. As I increased rpm, I glanced out the window A chill raced up and down my back. The longest, meanest, bluest flame was whipping out of number two and, for a moment, I was hypnotized. I hit the feather button and slammed the mixture control to "off" position. Bill was awake by now and pulled the CO_2 extinguisher It was over in a few seconds.

Mindful of the low ceiling back at homebase, I decided to land at the nearest field, which was almost directly under the plane, Napier Field. I called Napier Tower for landing instructions.

By this time, the feeling of panic had subsided and I began to feel proud of the way I had remembered the emergency procedure. Descent into the traffic pattern was uneventful, but once in the pattern, I again found myself in trouble. For some reason, I could barely hold the plane at traffic altitude. I increased power, but still she just mushed along. The turn into base leg and final approach was into the dead engine, so I nosed down slightly to keep from stalling. Finally, the runway lay straight ahead and the glide was established. A ground fog on the runway proved deceptive and, as I started the round-out, the ship settled like a brick. A quick burst of throttle almost up-ended us and then I remembered that I had only one good engine on my left, but two on my right. I chopped throttles and again the bottom seemed to drop out from under us. We landed with a thud that sent my adjustable seat flying down to the bottom position. I can still hear the ratchet on that seat.

I have long remembered that night. My first reaction in feathering the engine was right. But from there on, my over-confidence nearly proved my undoing. I had increased drag by lowering the landing gear, dropping one-third flaps and opening the cowl flaps while in the traffic pattern, thus making it almost impossible for the remaining three good engines to keep us airborne. Next, I lost sight of the unequal engine set-up, and when the ground fog deceived me, I was not expecting the violent reaction I got from the burst of power.

JOHN ARCHER

Mechanicsburg, Penna.

AVIATION ALPHABET

The aviation alphabet "language" is getting out of hand. Just to keep the record straight, here is a run-down of the most commonly used A to Z's.

ADF ..... Automatic Direction Finder

ADIZ .... Air Defense Identification Zone

ARTC .... Air Route Traffic Control

ASR ..... Airport Surveillance Radar

ATC ..... Air Traffic Control

CAVU .... Ceiling and Visibility Unlimited

CS/T .... Combined Station/Tower

DME ..... Distance Measuring Equipment

ETA ..... Estimated Time of Arrival

FM ..... Fan Marker

GCA .... Ground Control Approach (Military version of PAR)

IFR ..... Instrument Flight Rules

ILS ..... Instrument Landing System

INSACS .. Interstate Airways Communications Station

L/MF Ranges Low/Medium Frequency Ranges

NOTAM .. Notice to Airmen

OFACS .. Overseas Foreign Airways Communications Station

PAR ..... Precision Approach Radar

PPI ..... Planned Position Indicator

RAPCON . Radar Approach Control

RATCC . Radar Air Traffic Control Center

TACAN .. Tactical Air Navigation

TVOR .... Terminal VOR

UHF ..... Ultra High Frequency

VAR ..... Visual Aural Range

VFR ..... Visual Flight Rules

VHF ..... Very High Frequency

VHF/DF . Very High Frequency Direction Finder

VOR ..... Very High Frequency Omnidirectional Radio Range

THE McCONNELL STORY

The life of Capt. Joseph McConnell, Jr., America's first triple jet ace, is being told in a Warner Bros. film to be released this Fall. Demonstrating the "scissors maneuver" which McConnell developed and used so effectively in Mig Alley are the technical advisors on the film, Capt. Pete Fernandez (left) and Col. William L. Orris. Fernandez was a close friend of McConnell and was himself credited with shooting down more than 14 enemy planes.

When the picture was mid-way in preparation, the man whose exploits and character had inspired it was killed in the crash of an experimental jet aircraft at Edwards AFB, Calif.

The picture's introduction is made by Gen. Otto P. Weyland, Commander of the Tactical Air Command, dedicating it to the men of the Air Force who, like McConnell, have paid for America's freedom.

Uranium

(Continued from page 34)

that all the surface uranium indications have been spotted in well-known mining districts. Yet I can point out several recent discoveries by airborne equipment in well recognized uranium districts. As a personal comment on this point, I made a happy surface find myself just recently in a well-worked area; and the land had been vacant until I staked it. Two major uranium companies I know are now surveying by air their own wide-spread properties for the third time. Certainly land titles make the job of airborne prospecting more difficult in determining where lie open areas to be prospected. However, in any business where rewards may be great, one must expect many difficulties and keen competition.

The well-financed, airborne crew has distinct advantages over the mass of ground prospectors. The air unit can cover great distances in short periods of time and has a much better view of geological formations and structures which may be uranium bearing. On the other hand, airborne prospecting as a full time business is expensive. The airplane or helicopter, and the radiation detection unit alone will cost anywhere from $10,000 to $60,000. Then one must have a good

(Continued on page 76)

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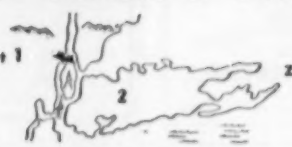

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(Continued from page 75)

ground crew to check all airborne discoveries and many of these will have no commercial value. The ground crew must have radiation detection units, jeeps, and a trailer in which to live. Portable equipment is necessary to drill and blast into more favorable anomolies (highly radioactive place of unknown commercial value). Air and ground crews draw good salaries for the work is hard and dangerous. Considerable supplies are essential to keep any exploration unit going. If you are planning full scale airborne exploration for even one year, you should be thinking in terms of $50,000.

The radiation detection unit used in the plane should be the finest obtainable as it is the key to the success of the venture. There seems to be some confusion as to what to use. However, research on the history of the various types of instruments by the U.S. A.E.C. and the Canadian AEC clears the matter greatly Both countries have spent considerably more time and money on this problem than the whole civilian radiation industry combined. In 1948, ion-chambers were used in extensive air experiments but were discarded as unsatisfactory. From 1949 through 1951, both the U.S. and Canadian AEC's used multiple Geiger tubes in airborne experiments and although they worked, cosmic ray interference and other factors eventually eliminated this type of instrument from airborne survey work.

In 1950, the first airborne scintillation counters were used—first with naphthalene and anthracene crystals, and in April, 1950, with sodium iodide crystals. This latter crystal has been used very successfully by both governments in their airborne work and is responsible for the major percentage of all the aerial finds. In the past few months, a still more effective crystal has been placed in commercial airborne units. It is a plastic phosphor crystal. It is much cheaper and does away with the temperature and breakage problem which the sodium iodide crystal presented. Improvements in the instrument field are being made constantly and a type which is the best obtainable today may be obsolete tomorrow. Along with the airborne scintillation counter should be included a good visual recorder, a radar altimeter and a sound alarm system. The recorder shows a continuous record of the radiation and altitude flown, and the sound alarm calls the observer's attention to any higher than normal radiation. Another item which can help greatly is a two-way radiotelephone system between plane and ground crew.

"Expert" uranium geologists are few and far between, so a survey crew itself should have as much knowledge and experience as possible. The "hunch" is not to be discarded, but must be as educated a hunch as possible.

If it's adventure you wish, try airborne prospecting. It's the wildest game in the Western hemisphere at the present time. And if you decide to do some rim flying —well, I'll be seeing you on the Colorado Plateau. END

I Learned About Flying from That!

(Continued from page 48)

It was my plan to call Erie and see if we could get in before any great change in weather. Then too, I wanted to get a new altimeter setting. Any drastic change in weather is usually accompanied by a change in pressure. Erie Radio gave us the new setting with quite a correction. They also informed us that the ceiling was 1,100 feet and visibility two miles. This didn't sound bad, as I knew I could let down through the stuff on the north leg of the beam. This leg extended out over Lake Erie where, of course, no obstructions existed. This then became our intended plan of action. We had approximately three hours of fuel aboard and were only about 60 miles from Port Erie. We picked up the feather edge of the inbound side of the beam and sat back to wait.

By the time the next weather sequence was due from Erie, I figured we would be over Ashtabula. I was familiar with the airport west of town and kept it in mind. Several minutes later, Erie Radio started the weather sequence. Ceiling was now 900 feet and visibility one and one-half miles. Weather had moved in from across the lake. As we sat there listening to reports of lowering weather, I noticed a break in the undercast which began to form off our right wing. The hole in the clouds appeared to be made by some swirling, clockwise current of air. Rapidly it began to widen. I called this to Jack's attention and started the Cessna on a 360 degree turn to watch the development of the break. As the 170 completed the turn and again picked up its heading on the inbound feather edge, Jack sang out, "Look! the hole is wide enough to go down through."

And it was. The break was approximately 2,000 feet in diameter and almost a perfect circle. Glancing down, I could see the ground and recognized a large barn with an aluminum top silo. This was one of the landmarks I used for locating the field at Ashtabula. We were five miles south of the airport and west of town—clear of industrial obstructions.

We flew the 170 into position over the hole. Then setting up an attitude of a mild spiral, we started down using the full inside diameter of the hole. A steep spiral so close to the ground can be fatal, if the maneuver develops into a spin. Cautiously we watched the airspeed and the unwinding altimeter. The pointers on the height gauge indicated 600 feet when we reached a position under the cloud layer. At first I thought we were over the hurdle until I viewed conditions. From the bottom of the low, scraggly clouds around hung a thick veil of mist which extended to the ground. It was as though we were in a clearing 2,000 feet wide which had been bored out of the foul weather by a giant drill. The veil was all around us. A sucker hole!

I had heard about these freak conditions existing in Alaska. I also remembered stories where heavier military aircraft had used such holes to get through an undercast and found themselves landlocked by mountains or obstructions.

(Continued on page 78)

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ROCKET INTERCEPTORS

By William Courtenay, O.B.E., M.M.

BRITAIN'S ANSWER to Russia's high altitude, high speed heavy bombers such as Type 37 is the development of rocket interceptors capable of rising to 60,000 feet in less than 4 minutes to meet an attacking force over the sea.

Although an early-warning radar chain is being installed from Norway to Turkey which ultimately would give Britain sufficient warning to mount conventional jet interceptors, two or three years must elapse before the chain is in effective operation. Furthermore, Britain does not intend to rely solely on this "West Wall" of invisible radar in Europe. Too much is at stake for "the tight little island", presenting as it does a highly concentrated target.

The Air Staff, therefore, is planning for the worst—a condition in which hostile bombers break through the European radar screen and approach the British coast, getting within 50 miles of British shores before warning is received. That reduces warning to 5 minutes.

The problem then is to develop a type of interceptor which can reach 60,000 feet from takeoff in 3 or 4 minutes at most and, with one minute in hand, can be satisfactorily guided to the target to ensure instantaneous destruction—over the sea.

At least two British firms are understood to be designing such an interceptor—a rocket motored fighter. They are Saunders-Roe, who expect to be first in the field, and A. V. Roe & Co. A rocket engine capable of driving planes at Mach 2 (1,500 mph) which could make existing jet power obsolete, has been announced by the Hawker-Siddeley Group, Ltd. It is the Armstrong-Siddeley *Screamer*, likely to be employed in the Avro fighter. The Saunders-Roe fighter will use the De Havilland *Spectre*.

At 50,000 feet, thrust power of a jet engine drops as much as 80 per cent of its sea level power. The need for liquid fueled rocket propulsion for boosting power in rarefied air is evident. As now visualized, the British rocket interceptor will use jet power for takeoff and initial climb. Rocket power will be used for accelerated climb when the jet power deteriorates, and for acceleration from Mach 1 to Mach 2 for the few moments needed for interception and the "kill." Return to base will be accomplished on the jet engine.

While some indication of the move toward rocket interceptors may be apparent at this year's Farnborough Air Display in September, it is likely that such an aircraft will not be displayed publicly until 1956. If the British designs are flying in 1956, it is unlikely they will reach RAF Squadrons before 1960. Thus, while Russia possesses a fleet of Type 37 bombers, the British face a grave gap in defense for the next five years.

(Continued from page 77)

Hurriedly I summed up the situation. To the south, rolling and hilly country; to the west, uncertainty; to the east, tall ore docks and buildings of the community; to the north was the lake—and the airport.

I decided to line up on the aluminum-domed silo and fly north looking for the airport. If we did not find it within five minutes, I planned to climb up through the overcast and continue on to Port Erie as originally intended.

Swinging around the sucker hole for the last time, I lined up the Cessna on the silo. A north heading was set up, the throttle pulled back for an airspeed of 100 mph, trim adjusted for level flight with hands off, altitude pegged at 400 feet, carburetor heat on, and with light pressure on the controls, we flew the 170 into the wall of haze and light rain.

Visibility through the windshield was nil. By looking straight down, we could see the ground about 80 per cent of the time. Fortunately, no turbulence was present and we were able to confine our interest to searching the ground below for any sign of the airport. It was unusually quiet in the airplane for the next four or five minutes. The engine noise was muffled by the rain; Jack pressed his face against the left side window, I pressed mine against the right one. Occasionally a crossroad, farmhouse or grove of trees would pass below. Just about the time I figured we had missed the field, I spotted a surplus UC-78 sitting on the ground. It was in the center of a small area surrounded by trees. I strained my eyes looking for a runway, or hangar. All I saw nearby was a small house. No clear area was available for a landing. How did the twin Cessna get in?

Upon a closer look at the airplane I saw some of the fabric was missing. Then it came to me! I remembered seeing the plane several months before when I landed at Ashtabula. Someone working on it had towed it into his back yard. The spot was only 50 or 60 yards off the east end of the runway.

Jack looked perplexed when I made a 90 to the left. This brought us right over the end of the runway but rather high. Cutting the throttle and dumping full flap, I pointed the nose of the Cessna down at a steep angle. We landed just beyond the mid-point of the runway.

It felt good to sit back and relax. The past half hour, literally had me on the edge of my seat. Now I had learned about sucker holes . . . the hard way. END

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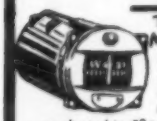

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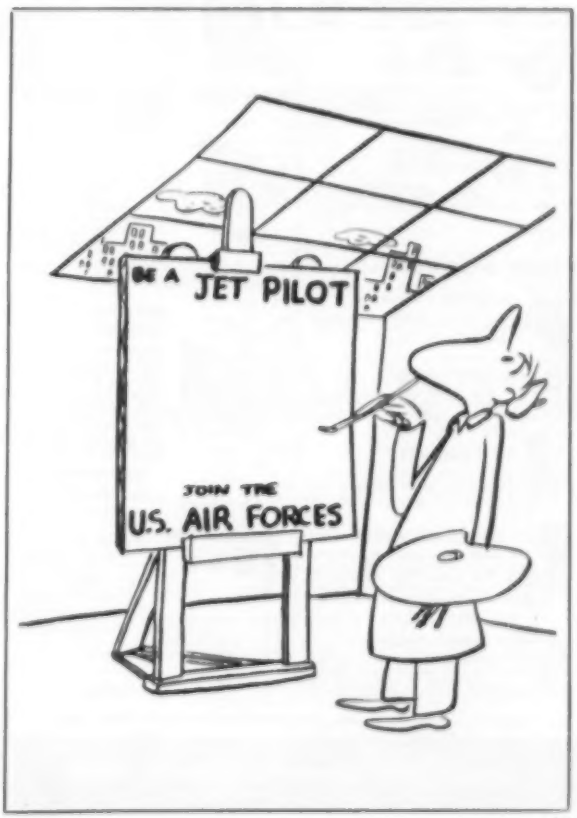

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Acme Flight School 78
Aero Design & Engineering Co. ..... Second Cover
Air Associates, Inc. 14
Aircraft Components, Inc. 80
Aircraft Owners & Pilots Association 60, 61
Aircraft Radio Corporation 56, 57
Aircraft Service Company 75
Aircraft Specialty Lines 8
Allied Briefcase 68
American Airlines 19
American Flyers 77
Atlantic Aviation 76
Avex, Inc. 71
Bar-B-Shop 72
Batori Computer Co. 56
Bowers Battery & Spark Plug Co. 62
Cessna Aircraft Corp. 51
Champion Aircraft Corporation 63
Criterion Company 78
Dare, Inc. 68
Douglas Aircraft Co., Inc. 12, 13
Embry-Riddle School of Aviation 55
Esso Standard Oil Co. ..... Third Cover
Flair 70
Flite-Tronics, Inc. 69
Flying Equipment Sales 66
Flynn, Dr. John T. 67
Gaara Supply Company 70
Globe Industries Inc. 71
Graubart Aviation 56, 65
Hartzell Propeller, Inc. 59
Hiller Helicopters 73
Indiana Technical College 75
Jardur Import Co. 71
Javelin Aircraft Company, Inc. 79
Jeppersen & Company 74
Kane Aero Equipment Company 78
Lear, Inc. ..... Fourth Cover
Line-O-Site 81
Lubar-Gyde, Inc. 70
Lycoming 3
McCauley Industrial Corporation 60
Mel-Co-Aire 54
Meyers Aircraft Co. 77
Mooney Aircraft, Inc. 7
Morlin Air Service, Inc. 73
Munk Aeronautical Corporation 63
National Aeronautical Corp. 16
National Aircraft Show 75
New England Helicopter Service, Inc. 70
Northrop Aeronautical Institute 4, 58
Pacific Airmotive Corporation 5
Palley Supply Co. 79
Pan-American Navigation Service 66
Parks College of St. Louis University 64
Pilots Employment Agency 81
Pinellas Aviation Service, Inc. 67
Piper Aircraft Corporation 17
Precision Radiation Instruments, Inc. 78
Reading Aviation 74
Ross Aero Publishers 77
Scott Aviation Corp. 6
Shannon School of Aeronautics, Inc. 70
Shell Oil Company 53
Socony-Mobile Co., Inc. 11
Southwest Airmotive Co. 65
Southwest Uniform Co. 72
Spartan School of Aeronautics 52
Springer Aircraft Radio Co., Earl W. 71
Standard Oil of California 15
Stennell & Holladay 69
Todd's 63
Tradewind Airport Corporation 65
True-Course Company 81
United Air Lines 62
U. S. Air Force 9
Vantage Press, Inc. 78
Vest Aircraft & Finance Co. 56, 66
Victor Tool Co. 67
Weems System of Navigation 57, 64, 70
Welch Aviation Company 75
William C. Weld 70
Wingwax Company 73
Zahns Airport 76
Zap Aero 70

PHOTO CREDITS

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10—PIPER AIRCRAFT, DOUGLAS AIRCRAFT, AMERICAN AIRLINES
12—BAR-B SHOP, READING AVIATION, WARREN AVIATION
14—HARBER-COLMAN, UNITED AIR LINES
24, 25—BOB AND IRA SPRING
31—AIR FORCE
32, 33, 34—CLYDE LONG
35—ERCO
37—LOCKHEED
38—ERICH ANDRES, ROSEMARIE CLAUSEN
39—CATHERINE BUCKER
40, 41—MCMAHON
42, 43—WM. BECKER
44—BRITISH INFORMATION SERVICE, BILL LARKINS, MCDONNELL AIRCRAFT
45—HOWARD LEVY, BELL AIRCRAFT
46—PAN AMERICAN WORLD AIRWAYS
47—DOWNIE AND ASSOCIATES
49—UNITED PRESS
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